Vol. III

TRANSCRIPT OF RECORD

(Pages 1569 to 2352)

Supreme Court of the United States

OCTOBER TERM, 1944

No. 56

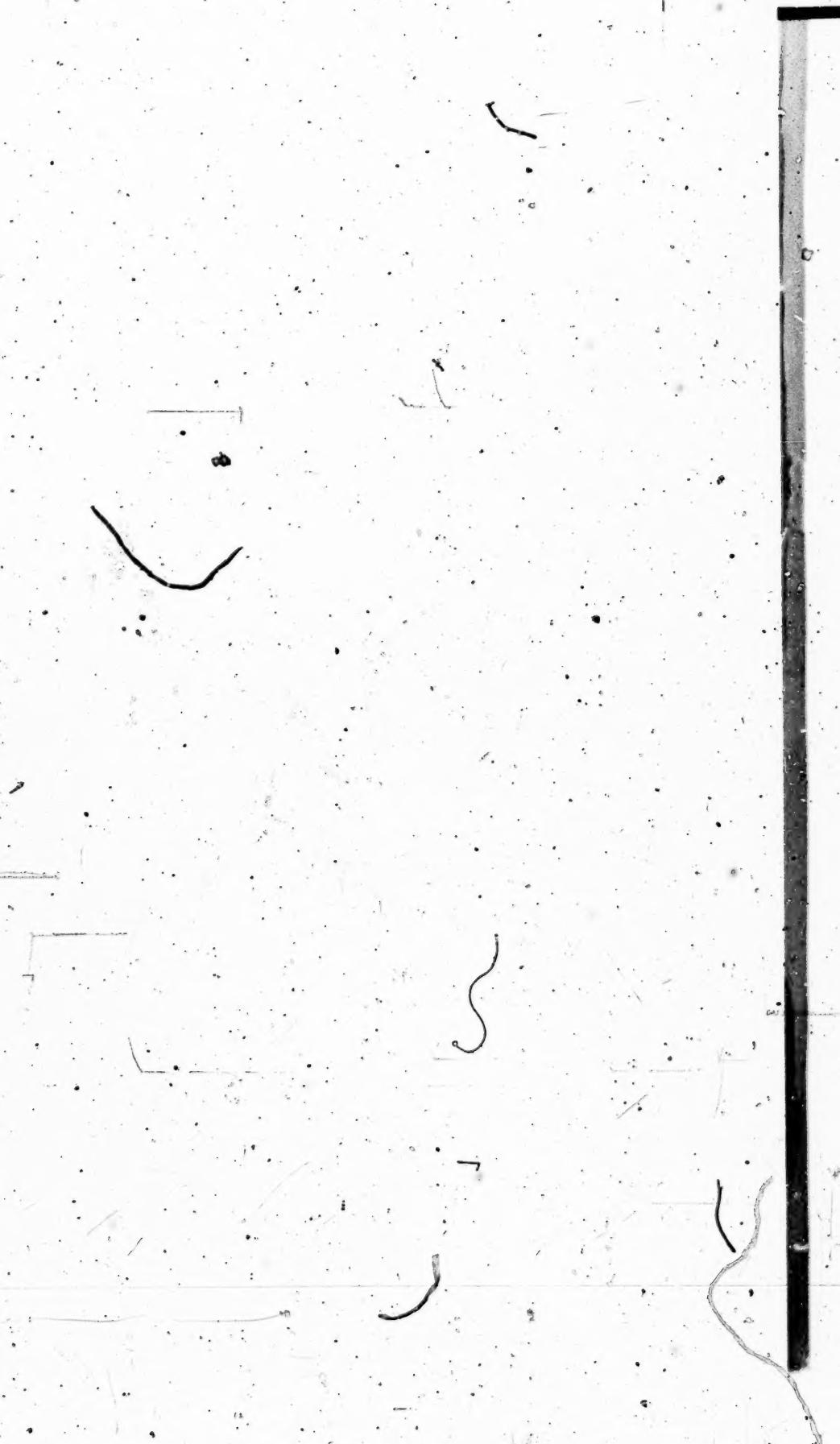
SOUTHERN PACIFIC COMPANY, APPELLANT,

vs.

STATE OF ARIZONA, EX REL. JOE CONWAY, ATTORNEY GENERAL OF THE STATE OF ARIZONA

APPEAL FROM THE SUPERIOR COURT OF THE STATE OF ARIZONA, COUNTY OF PIMA

FILED APRIL 12, 1944



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Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and [fol. 2883] marked, "Defendant's Exhibit No. 204.").

Mr. Booth: Are there any questions, Mr. Strouss?

Mr. Strouss: You mean on cross-examination?

Mr. Booth: Yes.

Mr. Strouss: I would prefer to defer my cross-examination until I have looked at these other books this evening.

Mr. Booth: Mr. Browning has an appointment in Montreal next Tuesday, a meeting of the Association, and if you could examine him tomorrow morning so that he could catch that eleven o'clock train out, he would be very much obliged to you.

Mr. Strouss: I think I can do that.

Mr. Booth: You are both at the same hotel, and if there is anything you want in the way of information from the files he has with him, which I think are complete, you can arrange for that after adjournment.

Mr. Strouss: Yes.

The Court: Mr. Browning, would it be profitable, or is it done by any of the roads, to actually construct more cars than they themselves might need in their business, with the thought that these cars might be scattered over other systems and used by them?

[fol. 2884] A. Now, your Honor, that is a question of policy of the railroads. Some roads do, or, rather, some roads are lending roads and some are borrowing roads.

Q. So far as cars are concerned?

A. Yes, sir.

The Court: You may step aside. We will take our mid-afternoon recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows:)

The Court: You may proceed.

W. P. HERBERT was recalled to the stand and testified further as follows:

Direct examination (Continued).

By Mr. Mason:

Q. Mr. Herbert, will you refer to Exhibit 202, please? I think you stated in your direct examination that you spent approximately two weeks on an inspection trip for the purposes of making the study which led to this exhibit?

A. Yes, that is right.

Q. Does that two weeks represent all of the time you spent in making the study and the calculations which en-
[fol. 2885] tered into the making of this exhibit?

A. No, it didn't. I spent several months doing the entire job and making the estimates.

Q. Did you gather the truck and station plans at the various stations for the purpose of studying the work to be done?

A. Yes, from the records that I have at my office. Such estimates as these in most cases can be made without any field investigation. However, the field investigation was made as more of a check than anything else.

Q. Does the exhibit represent as well the result of your knowledge gained from your sixteen years on the division?

A. Yes, sir.

Q. Have you before you a statement in a single sheet bearing the title "Yuma, Arizona, to El Paso, Texas, Increased Investment in Water, Round House and Shop Facilities Incident to Adoption of Long Train Program"?

A. Yes, I have.

Mr. Mason: May we have this statement marked, if your Honor, please, Defendant's Exhibit 205 for identification?

The Court: It may be marked.

[fol. 2886] The Clerk: Defendant's Exhibit No. 205 for identification.

Mr. Mason: Did you prepare defendant's exhibit No. 205 for identification, Mr. Herbert?

A. Yes, I did.

Q. Does it represent largely your own work rather than preparation from records?

A. It is preparation from my own work and from records.

Q. What type of records, and what records did you use for the purpose?

A. Well, we have standard plans of the various facilities that are to be installed as shown on this exhibit; and prices for those various facilities, in collaboration with the chief engineer's office, working together on it, we were able to estimate in each case the amount of money required.

Q. Does this represent another type of construction with which you are familiar?

A. Yes, sir.

Q. Now, will you refer, please, to the exhibit itself and, first, to block No. 1. Just what construction or reconstruction did you study in connection with Block No. 1?

A. Block No. 1 shows the amount of money necessary to extend five stalls and pits 65 feet at Yuma and Tucson; [fol. 2887] and build seven new stalls and pits to the roundhouse over the existing roundhouse tracks at El Paso.

The Court: That would be to take care of these larger and longer locomotives and trains that you refer to?

A. Yes, that is the purpose of the exhibit: to take care of the larger power that would be necessary.

Mr. Mason: Did you make a study of the existing facilities at Tucson, Yuma and El Paso, preparatory to this study?

A. Yes.

Q. Did you prepare plans for the construction which would be required if the facilities were to be fitted to the newer and larger power?

A. I had plans prepared for that purpose.

Q. Now, as to Item No. 2, what does that represent?

A. Block No. 2 shows the cost to install 126-foot turntable at Yuma, and Tucson, to replace existing 100-foot turntable.

Q. Why would turntables 126 feet long be necessary in place of 100-foot turntables?

A. Because the A.C. power as contemplated on the redispatching studies requires a turntable of that length. [fol. 2888] Q. Are turntables of that length in use on those districts where A.C. power is now in use?

A. Generally, yes, where they turn the engines on the turntable.

Q. Are these engines sometimes turned by the use of Y's instead of turntables?

A. Yes, sir.

Q. Is a Y a practical installation where you have to roundhouse engines?

A. No.

Q. From what sources were the cost figures for item No. 2 taken?

A. They were taken from the same sources as explained in No. 1, from our various standard plans that we have for such work and from field investigation.

Q. Have you studied or confirmed the results of the cost figures as applied here, from your own experience?

A. Yes, I have.

Q. Now, what as to Item 3?

A. Item 3 shows a transfer of the T. & N. O. erection shop to Pacific Lines property at El Paso, Texas. That T. & N. O. erection shop is a building that is not now [fol. 2889] used, but has certain machinery in it at El Paso which would be transferred to another location where it could be used and would be used for this larger power.

The Court: Does that refer to Texas and New Orleans?

A. T. & N. O. means Texas and New Orleans, yes, sir.

Mr. Mason: Is this a structure now at El Paso which would be transferred and thereafter necessarily used in the servicing of the AC-8 locomotives?

A. Yes, sir.

Q. Now, why do you transfer the T. & N. O. erection shop instead of building a new building at the location where you desire to have the installation for the servicing?

A. Because at El Paso at the present time we have now a 126-foot turntable at the location where those engines are now turned, and where the principal shops are located for servicing those engines used east of El Paso at the present time. Therefore, it is necessary that other engines, if assigned to the territory between Tucson and El Paso would be also turned on that turntable rather than building another one.

Q. Does this represent a lesser expense than to build [fol. 2890] a new building or build a new turntable at the present location of the erection shop?

A. Yes, it would be a lesser expense.

Q. What does Item 4 represent?

A. The installation of an additional water column and a 65000-gallon water tank at Benson, Arizona, that being necessary in order to pass long trains at that point.

Q. Then in connection with this exhibit it should be understood, should it, that the item covering the location of the water column and tank is at Benson opposite Item 4 and as indicated by column D?

A. That is right, yes.

Q. Why would these additional water supply facilities be necessary at Benson?

A. At the present time, the water columns at Benson wouldn't be a sufficient distance apart to permit the train standing on the side track, a long freight train standing on the side track, to take water without cutting the train in half and pulling back. So it was, therefore, necessary to provide this additional water column.

Q. What about the additional gallonage capacity, a 65000-gallon tank?

A. The tank was also deemed necessary. We figured it was cheaper to build a tank up near the new column rather [fol. 2891] than to build an expensive pipe line, which would necessarily have to be around a ten-inch line. It was cheaper to build a second-hand 65000-gallon watertank than to build a pipe line for the distance it would have to be built from the present water supply.

Q. You were faced with the choice of building another tank or of extending the pipeline from the present water storage tank to the new water columns?

A. That is right?

Q. And this is the cheaper alternative, is it?

A. Yes, it is.

Q. Have you yourself personally gone over these figures to determine whether they truly and correctly represent substantially the cost of bridges built or installing these particular facilities?

A. Yes, I have.

Q. Will you say whether or not, according to your information and experience, they are true and correct?

A. Yes, they are.

Q. Are these costs as of the year 1938 or the year 1946, or some other period?

A. They represent, as in the exhibit I previously put in, No. 202, costs and prices as of 1939.

[fol. 2892] Q. Will you say whether or not the 1939 costs and prices are fairly representative of those in 1938 or 1940?

A. Yes, they are.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: Items 3 and 4, where you contemplate the use of second-hand or used materials, what about items 1 and 2, are there any second-hand materials contemplated in those instances?

A. No; the 126-foot turntables are all new as well as the roundhouse pits installed would have to be new.

Mr. Strouss: That is all.

The Court: Well, Item No. 3 really consists, then, of a purchase in part?

A. Yes, it would have to be taken from the T. & N. O. and transferred to another railroad; it would be the same thing as purchasing second-hand material.

Q. Is the Texas and New Orleans a subsidiary of the Southern Pacific?

A. Yes.

Mr. Mason: Do I understand that there is any cost of material, or is this all the cost of labor in Item No. 3.

A. Well, Item No. 3 is principally a labor item in the [fol. 2893] whole. I possibly was wrong in saying that it was a purchase, it is just a transfer from one property to another.

Mr. Mason: Have you any further questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 205.

Mr. Strouss: Objected to as irrelevant and immaterial, and as calling for a conclusion.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 205.")

Mr. Mason: Do your wish to cross-examine Mr. Herbert now, Mr. Strouss?

Mr. Strouss: I had better take Mr. Baker first.

Mr. Mason: Very well.

The Court: Step aside. Call your next witness.

Mr. Mason: I will ask Mr. Baker to resume the stand.

[fol. 2894] G. C. Baker was recalled to the stand and testified further as follows:

Cross-examination.

By Mr. Strouss:

Q. Mr. Baker, referring to exhibit No. 196, which items of the redispatching study did you participate in?

A. Item No. 1.

Q. Item No. 1. What about Item No. 4?

A. No, I didn't participate in that study.

Q. Now, that was the redispatching study of Yuma, Arizona, to El Paso, Texas, excluding the Phoenix line, June and August, 1938, Freight Operations?

A. That is right.

Q. And, as I understand it, you took the traffic which was on hand on the first day of each of those months and the traffic that was received at Yuma during the period, and the traffic which originated at Yuma during the period, and that was the traffic which you redispatched?

A. Yes, sir.

Q. Now, in redispatching that traffic, did you balance the tonnage or balance the cars?

[fol. 2895] A. Well, I balanced the cars although I did take into consideration the tonnage, that is, in estimating the tonnage by scanning the consists or the tonnage shown on the consists of the actual trains, the consists that were filed by the train conductors which showed the actual tonnage of the actual trains, and I estimated my tonnage on that traffic.

Mr. Strouss: I asked that because yesterday I was trying to balance the tonnage on exhibit for identification 198, and Mr. Sines saw my difficulty and informed me last night that the balance was of cars and not of tonnage.

Q. That tonnage does show on the train sheets of actual operation?

A. Yes, it shows the actual tonnage.

Q. And on your train sheets for the redispatching the tonnage also shows for the trains redispatched?

A. It does on the district from Tucson to Lordsburg, which was the same as, or the tonnage was figured the same as it was on the district from Yuma to Tucson, which was merely an estimate based on the actual tonnage handled by averaging the cars and tonnage.

Q. Now, taking the operation which is covered by exhibit [fol. 2896] 198, that is one day. If it were desired to see how the tonnage balances as between the actual and the redispatched operation for the period covered by that exhibit, that tonnage can be taken from the sheets of that actual operation, the train sheets?

A. Yes.

Q. And the tonnage for the redispatch from your train sheets for redispatched trains?

A. Yes.

Mr. Strouss: Either you or Mr. Sines could give me that tonnage if I desire it?

Mr. Mason: I think, in answer to your question, Mr. Strouss, I believe that Mr. Sines could give you that information.

Mr. Strouss: Now, in redispatching trains, I think you testified you also took into consideration the traffic to be picked up and to be set out enroute?

A. That is right.

Q. And in the redispatching, if I remember your testimony, the AC-8 locomotive was used as the principal locomotive?

A. Yes, sir.

Q. Were there certain definite specific locomotives assigned to this operation by number?

[fol. 2897] A. No, we indicated the locomotive only by type or class. We designated them as 4100 class which is an AC type locomotive. We didn't assign any particular numbers to the locomotives.

Q. Of course, at the time the actual operation was had, that was in June, 1938, and in August, 1938, the Southern Pacific Company didn't operate any AC-8 locomotives?

A. No, those engines at that time were being built.

Q. They weren't acquired by the company until sometime in 1939?

A. That is correct.

Q. Had never been operated on the Tucson Division at the time you made the redispatch of these trains?

A. No, they had not.

Q. When was the test made of the locomotive by the dynamometer car to determine its tonnage rating?

A. Well, that tonnage rating was furnished us by the vice-president in charge of operations' office.

Q. Well, it wasn't the tonnage rating then determined by the use of dynamometer cars that Mr. Cassady testified this morning?

[fol. 2898] A. Not that particular type, the AC-8, no.

Q. What was the tonnage rating used for the AC-8's on the Tucson division?

A. Eastbound from Yuma to Gila was 11,000 M's, and, if I recall correctly, between Gila and Estrella 7,180 M's, and Estrella to Tucson 11,000 M's, and Tucson to Dragoon——

Q. 6,220?

A. 6,220. That is from Benson to Dragoon. I don't recall offhand the rating between Tucson and Mescal, but it is——

A. 7,800 is what was given to me.

A. Yes, that is correct.

Q. Now, of course, the rating of 6,220, there is no rating given here as between Steins and Lordsburg?

A. Well, that would be 11,000 M's or more, because it is on descending grade.

Q. And westbound between Tucson and Yuma?

A. 12,000 M's, and Lordsburg to Tucson over the ruling grades from Mondel to Steins and Benson to Mescal was 6,220 M's.

Q. Now, since no definite numbers were given to these locomotives, how did you know what locomotives you had on hand when you were redispatching?

[fol. 2899] A. Well, I kept track of these by keeping—I figured that I had an engine for every crew. I did dispatch the train crews, and any time that it was necessary to balance my train crews, or where it would have been necessary to deadhead an engine crew, I always deadheaded that engine back, so at all times I kept even on my power in accordance with the number of train crews that I had to operate with.

Q. If they were all designated as 4100's, how could you designate one engine from the other?

A. Well, I couldn't tell one from another, but I knew that of the number of trains I had operating, the number

of engines that I would receive at Lordsburg westbound, for example, that those engines would operate through to Yuma, and in cases where the train would terminate at Tucson westbound, I would have that number of locomotives left over. I felt at no time with the amount of business being handled and the number of AC locomotives assigned to that district, that we were ever short of locomotives.

Q. Now, when a locomotive made a trip you say you kept track of it by the train crew. In other words, you designated, so far as keeping track of that locomotive was [fol. 2900] concerned, you designated it by its train crew?

A. That is right.

Q. That was all right after the locomotive came into operation, but how did you identify the locomotives that you had available for operation before you assigned a crew to that so that you knew what power you had available?

A. Well, when this operation or this redispatching study was set up, we assumed that we had this number of locomotives on hand to protect traffic at both Tucson and Yuma.

Q. In other words, what you did, you determined the trains you were going to operate, then assumed you had the power there to operate them?

A. That is right.

Q. And whatever was necessary, the locomotives were there for you?

A. That is right, and in cases where it was necessary to deadhead crews from Tucson west to Gila, why, we knew that there was an unbalanced condition and it would be necessary to doublehead power to Gila to protect the eastbound trains.

Q. That is a lot more generous than they are in ordinary practice with power, isn't it?

A. No.

Q. You don't always have all the power that you want? [fol. 2901] A. There are times we would run short, yes, that we would be a little tight on it, but not really tied up.

Q. This operation was on the assumption that the power was always there?

A. That is right.

Q. Now, if I understood your testimony correctly, in making this redispatch, you were to operate in units of a maximum of 100 carloads and 125 cars and empties where the empties were predominant in the train.

A. That was the plan set up, but it exceeded the 100 cars eastward on a few occasions from Yuma with our slow scheduled Yuma blocks in just a few occasions, I forget just the number.

Q. Of ourse, the movement westward is predominantly empties?

A. Yes.

Q. And if you were to follow the principle of 100-car trains loaded with 125-car empties, that would eventually unbalance your power and cars?

A. No, it would tend to make a more balanced condition because your heavy traffic direction is westward, and with your empty cars moving west and if you would handle [fol. 2902] 125 cars westward and 100 cars eastward, it would more balance your power and cars.

Q. Is that true at all times?

A. Yes.

Q. That you would have 25 per cent greater traffic west than you would east?

A. Well, at least that much. During the perishable season we move a great many light engines, or double-head engines eastbound, in order to handle the excess train miles west.

The Court: Pardon me just a minute. Then this surplus, these surplus cars, this 25 per cent excess westward movement, what happens to them, does it eventually go out east again through the Ogden gateway?

A. Well, it can, yes, but it generally is empty refrigerators moving to the Yuma and Imperial valleys and to the P. F. E. shops at Colton, where the supply for the Santa Maria Valley and San Joaquin Valley supply is generally supplied from, and these cars are returned, are generally returned to us through the gateways in which they are received loaded, due to agreement with connecting lines.

[fol. 2903] Mr. Strouss:

Q. You mean that 25 per cent of your westward traffic returns east on some other route?

A. No.

Q. Wouldn't that have to be true, those cars don't remain on the West Coast, do they?

A. I am talking about the perishable season. There are other times of the year when the situation is reversed.

Q. That is what I asked you a little while ago, whether that is true all the time?

A. It is practically. Your train-miles or car-miles are westward the biggest percentage of the time, but there may be a short period where the operation might be reversed, where your train-miles eastward would predominate.

Q. If these cars don't remain on the West Coast, they either have to come back over your line or go over some other road?

A. Yes, they can be worked up and they are worked north to go through Ogden and we also, as late as this last perishable season, moved empty refrigerators over the Ogden route into the Imperial Valley due to our inability to get them through the El Paso gateway.

Q. Is it the usual practice for traffic going westward [fol. 2904] empty, that those cars will not return over your lines?

A. No, they may not all return over the same route, they may go the northern route.

Q. I mean return over the Tucson line?

A. Not necessarily all of it, no.

Q. Twenty-five per cent of it?

A. I wouldn't say as to the exact percentage, but a large amount of it would.

Q. When you made this study in 1939, these AC-8 locomotives had never been operated on the Tucson division?

A. No.

Q. There never had been any long trains operated on the Tucson division?

A. Not that I knew of.

Q. Unless it was before 1912. So far as you know, had any of those AC-8's been operated on any part of the Southern Pacific system in 1939?

A. No, not that particular class, I don't think they had. I think the AC-7 was the largest power we had at that time.

Q. Of course, in redispatching these trains you did determine the speed at which they would operate?

A. Yes.

[fol. 2905] Q. How did you do that?

A. That is something that is based on experience that a train dispatcher has over several years' experience by estimating the speed which a train will make. If you have a locomotive, take an AC-8 for example, rated at eleven thousand M's, if he has in the neighborhood of eight or nine

thousand M's you can figure he will make the maximum speed restrictions on a level grade or descending grade.

Q. That is, if he is carrying his tonnage rating?

A. Yes, over ascending grades an engine with lighter tonnage will make better speed than an engine with a full rating.

Q. What about a locomotive that had never been operated in your district so that you never had experience with actual operation of that locomotive? How did you determine that, just on its tonnage rating?

A. On its tonnage rating, assuming that it would operate the same as any other locomotive and with the percentage of the tonnage to its rating.

Q. Of course the tonnage rating here was not a tonnage rating determined as Mr. Cassady testified this morning [fol. 2906] by operating the engine over the territory with a dynamometer car?

A. No, I think that was determined by the superintendent of motive power as I understand it based on the tractive effort of the locomotive.

Q. It is a fact, isn't it, that a heavier train will take a greater distance to stop than a light train?

A. I won't say that because I have never had any road experience. I don't know.

Q. You don't know whether it takes longer for a heavy train to get under way, get up speed, than a lighter train?

A. It all depends on what power you have. If the engine rating is comparable on a long train to the rating of the locomotive on a short train, I would say he could get under way as quickly as a short train if his tonnage is equal.

Q. Not equal but in proportion to the tonnage rating?

A. Yes.

Q. Assuming that it takes longer to stop or slow down a heavier train than it does a light one, of course then a heavy train approaching a curve or in speed restricted districts will have to begin slowing down quite a distance from those speed restricted districts than a lighter train, wouldn't it? [fol. 2907] A. If that is the case, it would take a longer time.

Q. I am assuming that it does without any question.

A. Well, it would, yes.

Q. It would take a long train longer to pass through a speed restricted district than a short train?

A. Yes.

Q. Was that taken into consideration in the determination of the speed movement of your trains?

A. No, because with the additional twenty-five to thirty cars which we operated on our eastward trains we didn't estimate it would take any longer for those trains to stop or get started or pass through any restricted district. At that time we had no other restrictions except those speed restrictions as shown in our timetable and we made no allowance for them.

Q. What about sidings? It would take longer for the long train to stop and pull into a siding and clear a siding than a short train, wouldn't it?

A. It might take a few minutes more, I would say probably a couple of minutes.

[fol. 2908] Q. It would take longer to get out of the siding?

A. It might, yes.

Q. Was any consideration given to that?

A. I don't recall just whether we gave any consideration to that or not, although I know we did at times allow a little more time at some points in making our meets and passes.

Q. By the way, who selected those sidings or the extending of the sidings?

A. You mean who designated the sidings?

Q. The points where the sidings were to be increased in length?

A. Myself and the trick dispatcher went over the train sheets and working timetables and estimated the points at which the long sidings would be to best advantage for long-train operation.

Q. When did you do that?

A. That was after we first met in Los Angeles, approximately May 15th or some time there. We had two or three days' preliminary discussion before we started the actual redispatching study.

Q. Did you designate those sidings before you made your redispatching study?

A. Oh, yes.

Q. What about the icing? Was consideration given to the icing of perishables?

[fol. 2909] A. Yes, sir.

Q. Where are your icing sheds?

A. At Yuma and Tucson.

Q. What are their capacities?

A. I don't just recall the exact capacity of the tracks. At Tucson I believe on each side we have approximately 70 cars and at Yuma I believe the icing tracks are somewhat longer, I can't recall the exact number.

Q. The memorandum which was given me gives your icing tracks at Yuma, each side, 70 cars. Then there is a notation——

Mr. Mason (Interrupting): Isn't that the platform rather than the track. The figures you have I think are the length of the platform.

Mr. Strouss: It says, "Icing platforms and tracks."

A. Well, of course the tracks are longer than the platforms. You have some space on each end of your icing tracks or platform.

Mr. Strouss: In parentheses is the figure "67" and then "70." I guess I will have to have an interpretation of that. At least it is not over 70 cars at Yuma?

A. No, I believe that is right, on each side of the icing deck.

[fol. 2910] Q. With a train over 70 cars that requires the dividing of that train in order to ice it?

A. Yes, if they all require icing.

Q. The tonnage rating of the other engines which were used are the tonnage ratings given in that timetable?

A. That is given in the Tucson division timetable No. 109 which was given you yesterday, the tonnage ratings are all listed in that timetable.

Q. This redispatching, what it really is or what has been done is, to summarize it, is your opinion of how you would have moved those trains or moved this traffic, rather, assuming there had been no train limit law and assuming the power which you had, using your opinion as to the speed at which the trains would have moved although that power never had been used nor any trains operated in that division before; isn't that true?

A. That is right.

Mr. Strouss: I think that is all the questions I have.

Redirect examination.

By Mr. Mason:

Q. Mr. Baker, I show you the locomotive book and ask you whether or not the tractive power of the AC-8 type

[fol. 2911] locomotive acquired in 1939 is not the same, being 124,300 pounds, as the tractive power of the AC-6's acquired in 1930, the AC-7's acquired in 1937? Will you look at the locomotive book and tell me whether that is not the fact?

A. Yes, that is correct, they have the same tractive power.

Q. Would you expect the tonnage ratings of the AC-8 locomotives to be substantially the same as the AC-6's or AC-7's in view of the identity of tractive power?

A. Yes.

Q. The AC-6's and the AC-7's have been operated on the Southern Pacific in various districts for some time prior to 1938, have they?

A. Yes, they have.

Q. Have you, as dispatcher or chief dispatcher, ever had to undertake the operation of trains over your division with locomotives which up to that time you had never used on that division?

A. Oh, yes.

Q. Frequently?

A. Yes.

Q. Can you give some recent instances?

A. Just after I became chief dispatcher there were several F-4 and F-5 engines that were transferred to the [fol. 2912] Tucson division that hadn't been in use here before and engines with which the dispatchers had no previous experience on this division.

Q. Were you a dispatcher on this division when the 5,000 class was first used on the division?

A. Yes, sir.

Q. Were you a dispatcher here when the F type locomotive replaced the smaller type preceding it?

A. Yes.

Q. Did you have any difficulty then dispatching your trains with these new and up to that time strange type of locomotive?

A. No, none whatever.

Q. Given the tractive effort and other characteristics of the locomotive which is given to you to use, are you able as a dispatcher to work with that locomotive even though you have never used it before?

A. Yes, sir.

Q. I think you indicated in your testimony that generally there was an unbalance of traffic westward and particularly during the perishable season?

A. Yes, sir.

Q. Are there other seasons of the year when the unbalance [fol. 2913] is eastward?

A. There are times when there is a shortage of refrigerators moving westbound in which the preponderance of the traffic would be eastward for a short period of time. That happens generally in the early spring or the late fall periods, that is, on the Tucson division.

Q. From time to time during the year the balance of the traffic may vary so that the preponderance is eastward at one time and westward another?

A. Yes.

The Court:

Q. You don't mean to infer that the preponderance of the traffic or the cars causing that are just put out of commission and not used over on the West Coast?

A. No, I don't.

Mr. Mason:

Q. Does the company, if you know, have any control over whether the balance will be eastward or westward?

A. No, that is controlled entirely by the traffic conditions.

Q. That is the movement of the traffic as billed by the shippers, is it?

A. Yes, for example, we bring many empty boxcars through the Ogden gateway that move into the Northwest. [fol. 2914] A lot of that traffic moves down through the southern gateway after it is loaded and goes the southern route.

Q. That would produce an unequal distribution of traffic, would it, as between the Ogden route and the El Paso route?

A. Yes.

Q. You spoke of working to 100-car trains east and 125-car trains west during the redispatching study. Does that mean all of your westward trains were built up to 125 cars?

A. Oh, no.

Q. You observed that more or less as a standing maximum?

A. Yes.

Q. Does it mean that on your eastward trains you were held to 100 cars as a rigid maximum?

A. No.

Q. Was there necessarily any 25 per cent greater movement westward than eastward?

A. I won't say as to the percentage, although I think during those months if I recall, the westward movement was heavier, that is, the number of cars moved was in greater proportion westward than they were eastward.

Q. Whatever it was, in the actual operation during June [fol. 2915] and August, 1938, it was reproduced on your redispatching study, was it?

A. Yes, sir.

Q. Now as to the number of locomotives, meaning the number of the different engines or the number of engines which were actually used for the purpose of the redispatching study, as I understood your answer to Mr. Strouss you contemplated that an adequate number of locomotives was available at the start of the redispatching period and an adequate number continued to be available throughout the redispatching period?

A. That is correct.

Q. There was no engine shortage at any time?

A. No.

Q. Was there any engine shortage experienced actually during the same periods?

A. No.

The Court: Did you use a greater number of engines in your redispatching study than what was actually used in your operation?

A. No, we used a less number due to the less number of trains it was necessary to operate.

Mr. Strouss: Since there were no definite numbers assigned to the engines, you cannot determine that from your work sheets?

[fol. 2916] Mr. Mason: I will say for the information of the Court and counsel, we will have a showing which will show the exact number of locomotives required and used and I think it will be quite clear how it was worked out.

Mr. Sines will have the showing. There is a way of determining the number from the work sheets, at least I think there is, it has been determined before.

Mr. Strouss: You couldn't by taking an engine number and definitely applying it to any particular engine?

A. No, we didn't assign any particular engine numbers to this redispatching study.

Q. Did you use 4100, or whatever the number was and the engine went out on the division and came back again and another went out or it may have been the same one?

A. Yes.

Q. Are you operating any AC-8's on this division now?

A. No, we are not.

Q. Have you operated any on this division?

A. Yes, we have operated them westward when we were bringing these new locomotives westward, we put those into service at El Paso and worked them west.

[fol. 2917] Q. Just in transportation?

A. Yes.

Q. One thing I overlooked on my cross-examination. The water tank capacity was larger on the AC-8's?

A. Yes, they have a tender of possibly 22,000 gallons capacity.

Q. Those AC-6's and AC-7's that you spoke about are not shown on exhibits Nos. 4 and 5?

Mr. Mason: No, I think for the sake of brevity we showed the AC-4; then the AC-8, which is typical of the AC-6 and 7 as to tractive effort.

Mr. Strouss: Have the AC-6's and AC-7's ever been put in operation on this division?

A. No.

Mr. Strouss: That is all.

Mr. Mason:

Q. Mr. Baker, after the acquisition of the AC-8's in 1939, did you make any further survey of the redispatching study of 1938 in the light of the performance of those locomotives?

A. I didn't understand that question.

The Court: Read the question.

(The question was read by the reporter.)

Mr. Mason.

Q. Did you make any recheck of your redispatching study [fol. 2918] in the light of the performance of the locomotives as operated by the company?

A. No, I was assigned to other duties before we received the AC-8 engines and I never made any other check of the redispatching study.

Q. You have reviewed the redispatching study prior to testifying in this case recently, haven't you?

A. Yes.

Mr. Mason: I think that is all. Did you want to have Mr. Baker remain here tomorrow?

Mr. Strouss: No, I think I can release him with the understanding that if something should arise and I should want to cross examine him further I can call him back again.

The Court: You may be excused, Mr. Baker, subject to call. The court will be at recess until ten o'clock tomorrow morning.

Thereupon the court stood at recess until ten a. m. Friday, January 24, 1941.

[fol. 2919] January 24, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: You may proceed.

ARTHUR C. BROWNING, was recalled to the stand, and testified further as follows:

Cross-examination.

By Mr. Strouss:

Q. Mr. Browning, I believe you testified that you are, and have been, since January 1, 1941, secretary of the Association of American Railways?

A. Of the mechanical division.

Q. And prior to that time you were assistant secretary since 1919?

A. That is correct.

Q. Now, what is the Association of American Railways?

A. It is an association of the railroads to handle problems that are common to all railroads.

Q. Those problems are investigated by the Association of American Railways?

A. Through its committees, yes.

Q. And directors of research?

[fol. 2920] A. We used to have a director of research, but that position was abolished several years ago.

Q. When the investigations are completed, then reports are made?

A. As far as that applies to the mechanical divison, that is a customary practice.

Q. Then what is the procedure?

A. Well, the procedure, if a new specification is devised and they think it is desirable to put it into effect, it is submitted to a letter-ballot vote of the member railroads.

Q. The reports then are submitted to the member railroads of the Association?

A. That is right.

Q. And a ballot taken, and if it is favored it is adopted?

A. Yes.

Q. Now, are the proceedings of the Association recorded?

A. You mean of the mechanical division?

Q. Of the mechanical division, yes.

A. I don't just understand what your mean by recorded.

Q. As part of the basic records which you handed to me, the basic records from which the exhibits put in evidence [fol. 2921] yesterday, Exhibits 203 and 204, upon which those exhibits were based, are books entitled "Proceedings of American Railways Association, Division V, Mechanical."

A. Yes, sir. It shows the reports of the committee and the action taken on them at the annual meeting.

Q. And these are records upon which you based your testimony and the exhibits which were put in evidence yesterday?

A. Yes, sir.

Mr. Booth: Only as to interchange rules. I didn't refer to those reports for anything and everything that might be in them.

Mr. Strouss: Of course, there are parts of this that I desire to have made a part of the record here. I don't want to make the entire book a part of the record.

Mr. Booth: Well, we called this witness for the sole purpose of proving what the interchange rules of the Associa-

tion were as to interchange of cars between railroads at the present time, and also to prove the development of those rules since 1911 as the rules were promulgated and distributed to the member lines and other persons. Now, the witness under the foundational evidence rule brought with him the annual proceedings of the Association to show that [fol. 2922] those interchange rules were actually adopted by the Association. We made those available to counsel solely for that purpose, not for the purpose of putting in anything and everything or identifying anything and everything that he might choose as part of his own case. I see perfectly well what counsel is leading up to, but I think it will prove to be absolutely improper cross-examination.

Mr. Strouss: Of course, the exhibits that were put in go a little further than Mr. Booth has stated here. The second exhibit was the historical, chronological development of these rules, and as the witness testified, they are adopted, the rules, and then there are amendments by action of the Association in their annual meetings, and their action is recorded; the action leading up to it as well as the adoption of the rules. Now, I think that we have a right to anything relating to the subjects which are included in Exhibit 204, that we have a right to have that part of those reports identified as the record of the proceedings relating to those subjects and when opportunity arises to offer them in evidence, the question of whether they are then admissible in evidence will come up on the offer. These are the basic [fol. 2923] records on which the exhibits were made, as the witness has testified.

The Court: Mr. Strouss, do you propose to go into any matters other than the matters covered by direct examination, that is, those things having to do with the rules and their development?

Mr. Strouss: I intend to offer—I will have to, I don't want to, but if compelled to I will have to ask that each of those volumes be marked as an exhibit for identification in order to afford me opportunity to offer parts of it. I intend to offer the reports of committees and the director of research upon the tests and investigations respecting the air-brakes, the development of air-brakes leading up to the rule adopted in 1933, which is set out in the rule book.

Mr. Booth: Well, we submit that that would be entirely improper cross-examination. We offered the rules and

only the rules. The proceedings were brought in here to make sure that the rules offered were the rules adopted, it is the foundational rule that has been invoked so often in this case, but that counsel can go outside of that we submit would be entirely improper cross-examination, and equally improper to impound records in court that have nothing to [fol. 2924] do with the exhibits we offered.

Mr. Strouss: That is a debatable question, whether they do or do not.

Mr. Booth: Counsel is simply trying to put in in our case something that should be offered independently by him. It is getting in evidence, we might say, insidiously or by left-handed methods of cross-examination.

The Court: What is the question before the Court?

(A reference to the record was made by the reporter.)

The Court: There is nothing before the Court.

[fol. 2925] Mr. Strouss:

Q. In exhibit No. 203, Mr. Browning, I notice on page 16 the rule of interchange covering air brakes. Will you read that rule which appears in exhibit No. 203?

A. (Reading) "Air brakes meeting requirements of A. A. R. Specifications for Air Brakes adopted in 1933, required on all cars built new on or after September 1, 1933, and on all cars rebuilt on or after August 1, 1937. From owners. Air brakes meeting requirements of A. A. R. Specifications for Air Brakes adopted in 1933 or A. A. R. standard triple valves, required on all cars built new between January 1, 1919, and September 1, 1933; and, on all cars rebuilt between July 1, 1928, and August 1, 1937. In interchange. On and after January 1, 1945, all freight cars in interchange service must be equipped with air brakes meeting the requirements of the A. A. R. Specification for Air Brakes adopted in 1933. Each car owner shall make a report semi-annually to the Association of American Railroads showing by months the number of freight cars acquired and the number of freight cars on which brake equipment is converted, which information will be filed semi-annually with the Interstate Commerce Commission.

"Note.—The design of air brake equipment designated [fol. 2926] as "AB" meets all of the requirements of the

A. A. R. Specifications for Air Brakes adopted in 1933. Cars built prior to September 1, 1933, and equipped with "AB" brakes should be so stenciled; for cars built on or after September 1, 1933, and rebuilt on or after August 1, 1937, the date built or rebuilt will govern."

Q. The specifications referred to in this rule do not appear in these rules, do they?

A. No, they are part of the standards of the Association.

Q. Can any air brake appliance be used on a car in interchange without the approval of that appliance by the A. A. R.?

A. No, sir.

Q. When an appliance is used, it must have been tested?

A. It must be adopted as a standard. The rule requires that the A. A. R. standard be used.

Q. This rule which requires meeting the specifications from 1933 of course is a rule adopted after tests and investigation by the Association of American Railroads?

A. That is correct.

Q. Isn't it a fact that in 1924 and 1925, beginning in one of those years, pursuant or under an order of the [fol. 2927] Interstate Commerce Commission the Association of American Railroad began tests of air brakes?

A. It was around that time, I don't remember the exact date.

Q. And those continued through 1932?

A. Yes, sir.

Q. There were first "rack" tests?

Mr. Booth: We object, if the Court please, as improper cross-examination. We introduced the rules and nothing else.

Mr. Strouss: I think we should have a right to find out what this means.

The Court: Overrule the objection to the last question.

Mr. Strouss:

Q. There were rack tests, first, and then road tests?

A. There were laboratory tests followed by road tests.

Q. And different reports of those tests or investigations appear in these records of the annual proceedings, mechanical division, of the Association of American Railroads?

A. Yes, sir.

Q. Who is Harley Johnson?

A. He was director of research of the Association for [fol. 2928] a period of, I should say, seven or eight years.

Q. He made the reports concerning those tests and investigations?

A. He was in charge of all research work including those tests.

Q. When tests and investigations were completed, did he make what was known as an abstract report which was printed and published by the Association of American Railroads?

A. Yes, sir.

Q. Mr. Browning, I hand you plaintiff's exhibit No. 206 and ask you if that is a true and correct copy of the report made by Mr. Johnson and printed and published by the Association of American Railroads?

Mr. Booth: Just a moment, I don't want to put any obstacle in the way of counsel proving any publication of the A. A. R. or any of its committees and for that reason I don't object to this question but I certainly will object to any attempt on cross-examination to offer this report or any portion thereof.

The Court: We cross that bridge when we get to it. Proceed.

A. Yes, sir.

[fol. 2929] Mr. Strouss: Mr. Booth, I would like to have marked for identification certain parts of these records of the annual proceedings. I don't like to have the book itself made a part of the record.

Mr. Booth: I think that is exceedingly unfair here, to impound these records. A witness comes in making merely formal proof that he has with him the proceedings of the Association from which these rules were taken; there isn't any question as to the authenticity of the rules, the rules are published in these books and the series of books is produced. Now counsel for some purpose of his own wants to take these records and impound them in court here for use two or months hence. They are records of the Association and we think that is going entirely beyond the foundational rule.

Mr. Strouss: I don't exactly want them impounded in court, if your Honor please, but I may have to in order to have them available for offering in evidence parts which

I think are pertinent here. There are parts of the records which I want to make part of this record here. I don't mean to necessarily offer them in evidence but to identify them as part of that record. If counsel will agree that the parts I desire may be sustituted and these withdrawn, [fol. 2930] then there will be no reason for impounding these. I talked to Mr. Browning this morning and asked him about retaining the records here for a few days and he told me it would be all right.

Mr. Booth: The thing is I don't want them to go into the custody of the clerk. We can retain them here in our office.

Mr. Strouss: That is all right if you will stipuate that the parts I indicate may be put in as an exhibit for identification.

Mr. Booth: No, we won't stipulate that they may be introduced as an exhibit. We will keep the reports here and when the time comes for you to offer an exhibit you may offer them. I don't know what they are.

Mr. Strouss: If, when the time comes for me to use these records, you will stipulate that they are the records of the meetings?

Mr. Booth: Certainly, because many public libraries have copies of these proceedings.

Mr. Strouss: But those are not here and identified by the witness and these are. If you will stipulate these are the records which Mr. Browning has identified——

Mr. Booth: If you will specify what the reports are, we [fol. 2931] will undertake to have those reports or duplicates of them available for use during the trial.

Mr. Strouss: And will stipulate that they are the annual reports testified to by Mr. Browning in his testimony this morning, the same ones which I am now indicating by years?

Mr. Booth: Those are the reports, aren't they, Mr. Browning?

A. Those are the proceedings, yes.

Mr. Strouss: For the years 1929, 1930, 1931, 1932, and one volume which combines 1938 and 1939.

Q. These specifications adopted in 1933, Mr. Browning, referred to in subdivision 4 of rule 3, are those specifications contained in any other publication?

A. Yes, sir, they are contained in the Manual of Standards and Recommended Practice of the mechanical division.

Mr. Strouss: I think we should have those specifications as a part of the record.

Mr. Booth: I think inasmuch as the rule has been read and the specifications are part of the rule the specifications should be before the Court. We will undertake to furnish them.

Mr. Strouss:

Q. Do you know whether any brake other than the AB [fol. 2932] brake has been approved by the Association of American Railroads as meeting the specifications adopted in 1933?

A. No, sir, not to date.

Q. No other brake to date?

A. No, sir.

Mr. Strouss: That is all the questions I have.

The Court: Mr. Browning, you are associated with the same organization of which Dr. Parmelee is a director?

A. Yes, sir, but a different division.

Redirect examination.

By Mr. Booth:

Q. There is a brake known as the "K-type triple," isn't there?

A. Yes, but that doesn't meet the 1933 specifications.

Q. That K-type triple is permitted on cars in interchange?

A. Yes, it is standard for cars built prior to that date in 1933.

Q. And fully permissible in interchange?

A. Yes, sir.

Mr. Strouss: Until what date?

A. The date set in here is 1945.

[fol. 2933] Mr. Mason:

Q. Your division, Mr. Browning, is the mechanical division of the Association, is it?

A. That is correct.

Q. And Dr. Parmelee's division is the Bureau of Statistics?

A. Yes, sir.

Q. You maintain your headquarters in different cities?

A. That is right.

(Witness excused.)

W. G. Reid was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Mason:

Q. Will you please state your name and residence to the reporter?

A. W. G. Reid, El Paso, Texas.

Q. Are you in the service of the Southern Pacific Company?

A. Yes, sir.

Q. In what position?

A. Master mechanic, Rio Grande division.

[fol. 2034] Q. With headquarters at El Paso?

A. Yes, sir.

Q. Over what lines does your jurisdiction as master mechanic extend?

A. It extends from Lordsburg, New Mexico, to Tucumcari, New Mexico, and from El Paso via south line to Tucson.

Q. What has been your previous experience in the service of the Southern Pacific Company?

A. I started with the Southern Pacific in 1903, served an apprenticeship as a machinist and later advanced to journeyman, and I was with the Arizona Eastern for a number of years in various capacities, foreman, general foreman, and master mechanic.

Q. Has your experience been entirely in the mechanical department?

A. Practically all my experience has been in the mechanical department.

Q. How long have you been master mechanic at El Paso?

A. Since November, 1924.

Q. What are the duties of the division master mechanic in the position you now occupy?

A. The master mechanic is responsible for the power and equipment on his division and various classes of employees [fol. 2935] under his supervision. He reports to the superintendent of the division and the superintendent of motive power of the district.

Q. Does the master mechanic supervise the repair and reconditioning of rolling equipment used on the division?

A. Yes, sir.

[fol. 2936] Q. Is it part of the duties of the master mechanic to be familiar with the construction, condition and capabilities of the locomotives assigned to his territory?

A. Yes, sir.

Q. Does the master mechanic supervise the reconstruction and repair of cars?

A. In a supervisory capacity, yes.

Q. Do you have on the Rio Grande division an employee known as a car foreman?

A. Yes, sir.

Q. Is he under your jurisdiction?

A. Yes, sir.

Q. Do you have on the Rio Grande division repair tracks and other repair facilities for the inspection and repair of freight cars?

A. Yes, sir.

Q. Do those come under your jurisdiction?

A. Yes, sir.

Q. How are the employees classified and titled who have to do with the inspection and repair of freight cars?

A. We have what is known as car inspectors, car men, we have two classes, Class A and Class B car men.

Q. You have helpers?

[fol. 2937] A. Oh, yes, there are helpers.

Q. And electricians?

A. Electrical department electricians which have to do with cars.

Q. Now, these car men, are they actually repair men?

A. Yes, sir.

Q. Do you have, in addition to these car inspectors and car repairmen, other forces engaged in the repair of locomotives or the inspection of locomotives?

A. Yes, sir.

Q. Are they under your jurisdiction as well?

A. Yes, sir.

Q. For what purpose do you have these inspectors; what do they do?

A. Well, the purpose of the inspector is to inspect the locomotive or car to see that it is in safe and suitable condition, and meets the requirements and laws of the Interstate Commerce Commission.

Q. When you speak of rules, what rules do you have in mind?

A. As to what; as to cars?

Q. As to cars.

A. Well, the rules set forth by the A. A. R. Association, [fol. 2938] which governs the type and classes of cars, the various parts of the cars accepted.

Q. Are you familiar with the code of rules of the Association of American Railroads, which has been offered here for identification as defendant's exhibit No. 203?

A. Yes, sir.

Q. Do you have on the Rio Grande Division points at which freight cars are interchanged with other carriers?

A. Yes, sir.

Q. Will you name those points?

A. At Tucumcari, New Mexico, the Rock Island; El Paso, Texas, T. P., Texas Pacific, and Santa Fe, A. T. & S. F.

Q. And Texas and New Orleans Railroad?

A. The Texas and New Orleans.

Q. Do you interchange at Deming?

A. Yes, sir, we set out cars at Deming for the Santa Fe at that point, we don't have an inspector for interchange purposes there other than the agent.

Q. Now do you make inspection of cars which are received by you from connecting carriers at El Paso and Tucumcari?

A. Yes, sir.

[fol. 2939] Q. For what purpose do you make these particular inspection of cars received on interchange?

A. To see that the cars offered on interchange company with the rules contained in the manual.

Q. You mean Exhibit 203 for identification?

A. Yes, sir, and also meet the requirements of the Interstate Commerce Commission on safety appliance standards.

Q. Suppose that a car inspected at the interchange point fails to meet the requirements of Rule 2 or 3 in that it contains or has attached to it appliances or devices which do

not comply with the standards prescribed by rules 2 and 3 of Exhibit 203 for identification, what do you do with that car?

A. If that car doesn't meet the requirements of the rules, we reject them.

Q. What happens to the lading of such a car in case it doesn't meet such requirements?

A. It would have to be transferred to a car that would be accepted.

Q. Is every car that is tendered to you for interchange at Tucumcari or El Paso, inspected before movement over Southern Pacific lines?

A. Yes.

Q. Has that practice prevailed throughout your oc-
[fol. 2940] cupancy of the position as master mechanic?

A. Yes, sir.

Q. From your experience, will you state approximately how frequently and under what circumstance you have, during the past year, for example, rejected a car tendered to you on interchange?

A. When not complying with the rules?

Q. For not complying with the Association rules?

A. I don't recall of rejecting any car in the past year.

Q. Now, does that mean that cars tendered to you have been inspected and found to comply with these rules?

A. Yes.

Q. Will you say whether or not, in making these inspections, you have in the past and you do now comply strictly with the interchange rules as set forth in Exhibit 203 for identification and the preceding issues?

A. Yes, sir.

Q. I take it, that the code of rules as it exists at present, or has existed in the past, is virtually your bible on interchange inspections.

A. That is correct; we are governed by it solely.

[fol. 2941] Q. Do you maintain car forces for the purpose of making inspection of freight cars at various points on the division?

A. At our main terminals we have inspection forces.

Q. Now, irrespective of the inspections on interchange, do these forces inspect cars in freight trains before such trains leave those terminals?

A. Yes, sir.

Q. Do you maintain such forces at Douglas?

A. Yes, sir.

Q. At Lordsburg?

A. No, sir.

Q. Did you in the past maintain them at Lordsburg?

A. We did. I think the force at Lordsburg was discontinued in 1929 or '30.

Q. Did you heretofore maintain such forces at Carrizozo?

A. Yes, sir.

Q. Are they now maintained?

A. No, sir.

Q. When were they discontinued, if you recall?

A. Well, I can't recall definitely. They were discontinued [fol. 2942] prior to my time, along about 1923, that is not definite.

Q. Do you make inspections of freight cars and freight trains as they arrive at the principal terminals?

A. Yes, sir.

Q. As well as prior to departure?

A. That is right.

Q. Are the inspections by car forces at the present time as frequent either in point of time or as to miles traveled as in prior years?

A. How far back?

Q. Well, to 1924?

A. No.

Q. What fact, if any, has permitted you to reduce the frequency of inspection by car forces?

A. The improvement in the type of equipment handled.

Q. Mr. Reid, I think you stated that one of the necessary duties or qualifications of the master mechanic is to be familiar with the characteristics and capabilities of locomotives assigned to the division?

A. Yes, sir.

Q. And does that include knowledge of their pulling power?

A. Yes, sir.

[fol. 2943] Q. And the work which they will perform under various conditions?

A. Yes, sir.

Q. Is pulling power substantially the equivalent or the same as tractive effort?

A. That is right.

Q. And the work which will be performed under different conditions corresponds to the tonnage rating, does it not?

A. Yes, sir.

Q. Will you state whether or not the use of the dynamometer car is necessary to determine the tonnage ratings of locomotives if their tractive effort is known?

A. No, sir.

Q. Have you found it necessary to use the dynamometer car on the Rio Grande division in order to determine tonnage rating of locomotives?

A. Not to determine tonnage rating alone; we have used the dynamometer car last year on AC-9 locomotives to determine the tonnage that they can haul; the efficiency of fuel, water evaporation, and many other things that go along with the dynamometer car test.

Q. Were you on the division when the 5000 Class locomotives were first placed in service?

[fol. 2944] A. Yes, sir.

Q. Was it necessary to use a dynamometer car to determine their ratings?

A. No, sir.

Q. Are you familiar with the locomotives of the classes designated as AC-6, and 7, and 8?

A. I am familiar with them by knowledge, but not from practical operation.

Q. You are familiar with locomotives of the Southern Pacific generally, are you, Mr. Reid?

A. Yes, sir.

Q. Now, taking the AC-6, 7 and 8 designations as typical, does the designation of one series as AC-6 and another as AC-7, necessarily signify any substantial difference between the locomotives classed as 6's and those classed as 7's?

A. Not in the type of locomotive, no.

Q. Does the designation of still a more recent series of locomotives, as the AC-8, mean that they differ essentially from the AC-6 and 7?

A. Not to a great extent, no.

Q. Do the Southern Pacific 5000 class locomotive, is there any substantial difference between the SP-2 and SP-3 class?

A. No, sir.

Q. What is the significance of this series number, so to [fol. 2945] speak?

A. Well, when the locomotive is first purchased, say in 1910, they designate it as AC-7.

Q. I think the AC-7 was brought out in 1937.

A. That was for illustration. Later on, they may purchase the same type locomotives with some minor improvements on that locomotive which will change the seven to an eight, for illustration.

Q. There will be preserved perhaps the same wheel arrangment?

A. Yes, sir.

Q. The same tonnage rating?

A. Yes, sir.

Q. The same boiler pressure?

A. Yes, sir.

Q. You are familiar, of course, with the S. P. type locomotives, are you?

A. Yes, sir.

Q. They are in continuous use on the Rio Grande division, are they not?

A. Yes, sir.

Q. Now, with reference to the S. P. 2 type of locomotive which is referred to on Exhibit No. 5 do you recall, by the way, when the SP-2 was first placed in service on the Rio Grande division?

A. No, I can't recall, I think it was along in 1930, somewhere along in there, 1932.

[fol. 2946] Q. Do you recall the numeral series of the SP-2 type assigned the 5000 numbers?

A. Yes, 5000 on to 5039.

Q. That includes all the SP types?

A. Yes, sir.

Q. Mr. Russell's exhibit No. 7 shows that in 1926 locomotives numbered 5016 to 5038 were purchased. Would that be the SP-2 type?

A. That might be the SP-3,—let's see, probably the SP-2 followed by the SP-3.

Q. I show you the Southern Pacific locomotive book. Will you state by reference to the locomotive book when the SP-2 type was purchased?

A. 1926.

Q. Now, having the SP-2 type of locomotive in service, followed by the purchase, a year or more later, of the SP-3 type, which, according to exhibit No. 7 has the same tractive effort and substantially the same weight on drivers, would it be possible when the SP-3 type arrived on the division, to determine in advance the performance which you could reasonably expect of it, basing that determination upon the performance already had of the SP-2 type?

A. Yes, sir.

[fol. 2947] Q. And the fact that there was a difference in the numeral series, as between the two and three designation, wouldn't handicap you in that determination, would it?

A. Not at all. It would be governed by the tractive power of the locomotive just the same.

Q. The locomotive being similar as to wheel arrangement?

A. Yes, sir.

Q. And other essential characteristics?

A. That is correct.

Q. Then having the AC-8 class with the same tractive effort as the AC-6 and 7, would the same results follow?

A. Yes, sir.

Q. Mr. Reid, I think you mentioned in your statement of the character of the inspection given, that your employees at the interchange points inspect for compliance of I. C. C. standards?

A. Yes, sir.

Q. Just what standard do you have in mind there?

A. That is all safety appliance standards, such as handholds, steel steps, high and low couplers, defective wheels, brake hangers, brake beams, anything that is specified by the law.

[fol. 2948] Q. Suppose that an inspector discovers a safety appliance defect, is that the term you use, by the way?

A. Yes.

Q. Suppose an inspector discovered such defect on a car as it is inspected at the receiving point, what action is taken?

A. That defect must be corrected before the car is permitted to go forward.

Q. Does that mean an immediate repair?

A. Yes, sir.

Q. Or, if repair cannot be accomplished, what is done with the lading in the car?

A. If the repair could not be made in the train yard, the car would be sent to the repair track.

Q. Does that sometimes mean a transfer of the lading?

A. Well, those cases are rather remote.

Q. You mean the transfer of the lading is comparatively rare?

A. Yes.

Q. Safety appliance defects are capable of repair usually in the train yard or light repair track?

A. Yes, that is right.

[fol. 2949] Q. Suppose that inspection reveals some damage to the car not affecting either A. A. R. standards or safety appliances, what is done with the car?

A. Well, if the repair is not made, a defect card is issued stating the defects existing on the car at the time of inspection. It is either forwarded to destination or if the car was homeward bound it would go to the owner where he would make repairs at the first available point and bill the line responsible for such repairs under the rules of the A. A. R. Association, mechanical section.

Q. Now, that repair card you speak of being issued in the case of this particular class of defect is actually tacked on the car as it goes forward, is it?

A. That is correct.

Q. Can you give an example of a class of defect which would not involve either a safety appliance defect or a defect calling for rejection on interchange?

A. Well, we can take on our P. F. E. cars, the wood upper structure, the wood sheating and a raked siding as we call it, there may be four or five boards in the siding raked to a depth where they are condemnable and hence need to be renewed but would not damage the contents of the car [fol. 2950] while enroute.

Q. And wouldn't involve any safety appliance defect?

A. No, sir.

Mr. Mason: You may cross-examine.

Cross-examination.

By Mr. Strouss:

Q. With respect to your testimony concerning boiler pressure, of course, difference in boiler pressure will affect

the power of an engine?

A. That is right.

Q. The greater the boiler pressure, the more power the engine has?

A. Yes.

Q. When you said that tonnage rating is governed by tractive effort only, do you mean that exactly?

A. Well, that is the formula used in determining the tonnage rating of a locomotive, it is taken, starts from the tractive effort of the locomotive.

Q. Tonnage rating is the tonnage that the locomotive will pull, isn't it?

[fol. 2951] A. Yes, at a given speed. The speed is determined, as to the maximum, say at twelve miles an hour, or fifteen.

Q. In other words, that is the drawbar pull?

A. Yes.

Q. And the tractive effort wouldn't take into consideration the weight of the locomotive itself?

A. Oh, yes, sure; yes, weight, cylinder size, boiler pressure, weight on drivers is effort.

Q. In the tractive effort, do you consider the weight of the engine?

A. The weight would have to be primarily used to determine the tractive effort.

Q. Isn't the difference between the drawbar pull, that is, the pull of the engine after taking away the effort necessary to move the engine itself?

A. Well, the drawbar pull excludes the locomotive, I understand it.

Q. Isn't that the difference between the tractive effort and the drawbar pull?

A. Well, I can't answer that question whether it is figured exactly that way or not.

Mr. Strouss: That is all.

[fol. 2952] Redirect examination.

By Mr. Mason:

Q. When you speak of the weight of the engine entering into the tractive power, you have in mind the weight of the engine causing adhesion to the rail?

A. That is right.

Q. That is calculated in before the final units of tractive effort is arrived at, is it not?

A. I understand that.

Q. And the tractive effort bears a direct relation to the tonnage rating, which is the amount of the tonnage which the engine will move at a particular speed and over a particular district?

A. That is right, you would have the power of the locomotive to determine the tonnage it will haul over a given grade at a given speed.

Q. Tractive power is the same for a locomotive wherever it may be?

A. Yes.

Q. But tonnage rating is what it will do under certain conditions?

A. Yes, at a particular speed.

Mr. Mason: That is all.

Mr. Strouss: That is all.

(Witness excused.)

[fol. 2953] The Court: We will take our recess at this time.

(Thereupon, a short recess was taken, after which proceedings were resumed as follows:)

[fol. 2954] A. F. Burke was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Mason:

Q. Will you please state your name and residence to the reporter?

A. A. F. Burke, Tucson.

Q. What is your position with the Southern Pacific Company?

A. Master mechanic, Tucson division.

Q. How long have you been master mechanic of the Tucson division?

A. Since January, 1925.

Q. Or for sixteen years?

A. Yes, sir.

Q. Did you have experience prior to that time in the mechanical department of the Southern Pacific Company?

A. Yes, sir.

Q. With the car or engine repair forces?

A. In the locomotive department.

Q. You heard Mr. Reid's description of the duties and responsibilities of the master mechanic of the Rio Grande division, did you?

[fol. 2955] A. Yes, sir.

Q. Are your duties and responsibilities as master mechanic of the Tucson division similar?

A. Yes, sir.

Q. Does your jurisdiction extend over the entire lines of the Tucson division?

A. Yes, sir, from Yuma to Lordsburg through Phoenix and through Gila.

Q. What points on the Tucson division are there at which you interchange freight cars with other carriers?

A. Phoenix, Arizona, and Nogales.

Q. Do you maintain inspection forces at those points?

A. Yes, sir.

Q. Do you make inspections for the determination whether cars offered in interchange comply with A. A. R. requirements?

A. Yes, sir.

Q. What standards would such cars meet? Is it set down in any publication?

A. According to the Code of Rules of the A. A. R. and safety appliance.

Q. Is that the Code of Rules which has previously been identified here as exhibit No. 203 for identification?

[fol. 2956] A. Yes, sir.

Q. You also inspect for compliance with the safety appliance rules of the Interstate Commerce Commission?

A. Yes, sir.

Q. In the same manner as has been described?

A. Yes, sir.

Q. In your experience how frequently do you find it necessary to reject a car offered in interchange because of failure to comply with the A. A. R. Code of Rules?

A. In checking up I can't find that we had any in Phoenix that the A. A. R. don't comply with.

Q. You never have had any at Phoenix in your experience?

A. No.

Q. What about Nogales?

A. We have occasionally where they come out of Mexico that they will put a defect card on and route it to us and we make the repair.

Q. Where a defect card is put on, does that mean that the car can be moved and repaired at the first repair point?

A. Yes, sir, providing it is safe.

Q. Where you find a car defective as not complying with Interstate Commerce Commission safety appliance require-

[fol. 2957] ments, what do you do with it?

A. We always repair them.

Q. At once?

A. At once, if it is at a terminal where we have car men; if not, then the crews are notified to that effect. At the first place they arrive they are repaired.

Q. Do you maintain car inspection forces on the Tucson division at points other than Nogales and Phoenix?

A. Yes, we have them at Yuma and Tucson.

Q. What inspections do your car forces make at Yuma and Tucson?

A. On all trains arriving and departing.

Q. For what defects do they inspect?

A. For the wheels, running gear, draft gear, safety appliances, see that they conform to the A. A. R. rules.

Q. If you find a car not conforming to the A. A. R. rules, what do you do with it?

A. We tag it and repair it before it moves.

Q. Suppose you found some car, for example, at Tucson on your inspection which has arch-bar trucks instead of side frames, what do you do with that car?

A. That car cannot be moved off the division.

[fol. 2958] The Court:

Q. These inspections that you and your forces make are rather thorough inspections, not just casual inspections?

A. No, our car inspectors are all familiar with the Code of Rules and also have their gauges and make a thorough inspection of wheels and equipment.

Q. Does that require them to get down under these cars?

A. They do, to look at the brake rigging as they go by; yes, sir.

Mr. Mason:

Q. You say that a car with arch-bar trucks cannot be moved off a division. Is that because arch-bar trucks have been outlawed?

A. Yes, sir.

Q. By the A. A. R. code?

A. By the A. A. R. code, yes, sir.

Q. Are you familiar with the locomotives generally in service on the Southern Pacific lines and particularly those on the Tucson division, Mr. Burke?

A. Yes, sir.

Q. Are you familiar generally with the tractive effort and tonnage ratings of the various types previously or presently in use on this division?

A. Yes, sir.

[fol. 2959] Q. Do you know and, if so, will you state whether in your sixteen years as master mechanic here the dynamometer car has actually been used for the purpose of obtaining tonnage ratings of locomotives on the Tucson division?

A. No; the car has never been here for that purpose during my time.

Q. Were the F-4 types of locomotives brought to the division for use here since you have been master mechanic?

A. Off and on. They were here prior to my time and then they were away and came back.

Q. They are now in use here?

A. Yes.

Q. Was it possible to determine their tonnage rating by reference to their tractive effort?

A. Yes, sir.

Q. Did you follow the same process when the S. P. type locomotives were placed in service here?

A. Yes, sir.

Q. Will you say whether or not the locomotives in use on the Tucson division at the present time are equipped with power reverse gears?

A. Yes, sir. Not all the locomotives are, those that weigh 150,000 pounds on the drivers or over are equipped with power reverse gears.

[fol. 2960] Q. Would that include the Mikado type?

A. Yes, sir.

Q. And the F type?

A. Yes, sir.

Q. And all later types?

A. Yes, sir.

Q. Are they equipped or any of them equipped with the so-called "8-ET" brake equipment?

A. Yes, sir, that is the latest locomotive brake, the T equipment.

Q. Is that equipment on all these locomotives in main line service?

A. Yes, sir.

Q. Are these locomotives or any of them equipped with back pressure indicators?

A. Yes, sir.

Q. Is that universal?

A. No, that is on the later type and they are putting it on some of them as they go through the shop.

Q. Commencing with what series or type?

A. We have some F 4 with the back pressure gauge on. I don't think there are any of them smaller than that.

Q. Are they on the S.P. type?

A. Yes, on some of them.

[fol. 2961] Q. Is it on the Mountain type?

A. No, sir, I don't think so. They run right through here, I think some of them are equipped; in other words, they intend to equip all of them as they go through.

Q. Are you familiar by observation with the coal-burning locomotives used by the Southern Pacific?

A. Yes, sir.

Q. Are these equipped with mechanical stokers?

A. Yes, sir.

Q. Are the S.P. locomotives on the Tucson division equipped with feed water heaters?

A. The majority of them.

Q. Super-heaters?

A. Yes, sir, all super-heated.

Q. Are they equipped or any of them equipped with speed indicators?

A. None of them are on the Tucson division, no, sir.

Q. There is an appliance known as the "valve pilot," is there not?

A. Yes, sir.

Q. Are you familiar with it?

A. Yes, sir.

Q. Is that coming into use on the later types?

[fol. 2962] A. All power now being received has that equipment.

Q. You have seen it applied on the newer types as they pass through Tucson?

A. Yes, sir, and I also visited El Paso and looked over one of them.

Q. What is the function of the valve pilot?

A. Showing the back pressure that is working against the pistons in operating the locomotive and also the speed recorded.

Q. It is a speed recorder, is it?

A. Yes, sir.

Q. You spoke of an inspection by car forces at Tucson. Is that inspection given to all cars whether refrigerator cars or of other ownership?

A. All cars are given the same inspection, thorough inspection.

Q. Mr. Cartmill of the Pacific Fruit Express Company in his testimony testified as to inspections made by car forces employed by the Pacific Fruit Express Company. I will ask you whether the inspection made by your car forces is combined with or in addition to that made by the Pacific Fruit Express Company forces?

A. No, they are separate inspections.

Q. Are the points at which car force inspections are [fol. 2963] made today the same as in 1925 when you became master mechanic?

A. Yes, sir, the same.

Q. You haven't made any reduction in the inspections?

A. No, sir, not on the division.

Mr. Mason: I think that is all, thank you.

Mr. Strouss: No cross-examination.

(Witness excused.)

F. P. McDONALD was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Mason:

Q. Will you please state your name and residence to the reporter?

A. F. P. McDonald; residence, Glendale, California.

Q. Your official headquarters?

A. Los Angeles.

Q. What position do you occupy?

A. Master mechanic, Los Angeles, division.

Q. How long have you been master mechanic?

A. Since July 1, 1923.

[fol. 2964] Q. Did you have prior experience in the mechanical department of the company?

A. Yes, I started as machinist apprentice and worked as a machinist prior to coming to the Southern Pacific in 1903.

Q. You have been with the Southern Pacific Company since 1903?

A. Since September 27, 1903, as roundhouse foreman, general foreman, assistant master mechanic, and master mechanic.

Q. For eighteen years approximately you have been master mechanic at Los Angeles?

A. Eighteen years approximately.

Q. You heard the testimony of Mr. Reid and Mr. Burke as to the duties and responsibilities of the division master mechanic, did you?

A. Yes.

Q. Are your duties and responsibilities the same as testified to by them?

A. Yes, sir, the same responsibilities.

Q. As master mechanic, do you become familiar with the use and capabilities of locomotives in service on your division?

A. Yes, sir.

Q. Have you had or do you now have in service on the Los Angeles division locomotives of the AC type, particu- [fol. 2965] larly identified as the AC-6, AC-7, and AC-8?

A. We have had AC-6 and AC-7's operating on the Los Angeles division. We now have the AC-8.

Q. From your experience with these AC locomotives, will you say whether there is any substantial difference in performance as between the AC-6, AC-7, and the AC-8?

A. There is no difference in the performance. There is some difference in the gadgets or appliances on the locomotives which has developed a more modern method of operation.

Q. Mr. Burke testified that locomotives being recently received are equipped with the valve pilot. Is that one of the characteristics of the AC-8?

A. That is one of them.

Q. Is that a difference as between the AC-8 and the AC-6?

A. Yes.

Q. Are the other differences between the two locomotives of the same character, generally speaking?

A. They have gauges that indicate the heating of the fuel oil and gauges that will indicate the water level or gallons of water in the tender.

[fol. 2966] Q. As to boiler pressure and hauling capacity, the two are the same, are they?

A. The same tractive effort.

The Court: What do you mean by "valve pilot"?

A. That indicates the speed of the locomotive, also it indicates the back pressure, exhaust pressure or resistance of the pistons to the cylinder head and also the pressure at the steam chest where the steam gets egress to the cylinder.

Q. All that is registered at a point where the engineer can readily see it?

A. Yes, sir.

Mr. Mason:

Q. I take it that the valve pilot is something like a speedometer or other gauge on the dashboard of a motor car, as an assistance to the operator?

A. Yes, even better.

Q. It does not affect the hauling capacity or other characteristics of the locomotive?

A. No, it makes it easier for the locomotive engineer to do a better job in operating the locomotive.

Q. You heard Mr. Burke's testimony as to the appliances, such as feed water heaters, back pressure indicators, power reverse gears, and so forth. Are those likewise applied to locomotives in general use on the Los Angeles division?

[fol. 2967] A. The new or heavier locomotives come to us with the air reverse and the back pressure indicators. The older types of locomotives are now having the air reverse applied, or what they call the "power reverse."

Q. Does that relieve the locomotive engineer of some of his manual labor?

A. It has increased the efficiency of the locomotive.

Q. You heard Mr. Burke's testimony as to the 8-ET brake equipment. Is that also in use on your locomotives?

A. Practically all of the later type locomotives and with the possible exception of a few of the Consolidation type.

Q. Is the 8-ET brake equipment applied to substantially all of your locomotives in main line freight service?

A. Yes, sir.

Q. And in main line passenger service?

A. Yes.

Q. Do you have any points on the Los Angeles division at which freight cars are interchanged as between Southern Pacific and connecting carriers?

A. Los Angeles and Colton.

[fol. 2968] Q. Those are your principal interchange points, are they?

A. Yes.

Q. Do you maintain inspection forces at those and other points for the purpose of inspecting cars?

A. Only at Los Angeles.

Q. Where cars are received at Colton, what is done with those cars?

A. We accept the inspection of the delivery line.

Q. Of what employees do those inspection forces consist at Los Angeles, what character of employees?

A. Car inspectors.

Q. Car forces as distinct from train service employees?

A. Yes, car forces.

Q. Are they under your immediate jurisdiction?

A. Yes, with the exception I have a master car repairer under my supervision.

Q. Are these inspectors also accompanied by car repair men?

A. Do I understand your question—do we have car repair men?

Q. Yes.

A. Yes, we have car repair men.

[fol. 2969] Q. The inspectors themselves sometimes make minor repairs, do they not?

A. Yes.

Q. For what purpose do you make these inspections on interchange at Los Angeles?

A. To have assurance that the cars meet all the requirements of the A. A. R. rules and safety appliances.

Q. And incidentally for any defects which do not involve A. A. R. rules or safety appliances?

A. Any other cause which would be a contributing cause to accidents.

Q. If a car does not conform to the standards set up in the A. A. R. Code of Rules governing the interchange of cars, what do you do with it?

A. If the defect was such as a weak siding or damaged siding, we would place a defect card on it.

Q. Suppose that a car arrives with arch-bar trucks, what do you do with it?

A. It would be immediately removed from service.

Q. You reject that on interchange?

A. Right there.

Q. In your experience do you find it necessary to reject cars on interchange from time to time?

A. No, in the year 1940 we haven't a record of one car [fol. 2970] rejected.

Q. Does that mean that they have been found after inspection to comply with A. A. R. standards?

A. Yes, sir.

[fol. 2971] Q. What are the railroads with which you interchange at Los Angeles?

A. The Union Pacific and the Santa Fe interchange.

Q. Do you interchange with the same railroads at Colton?

A. The Pacific Electric and the Union Pacific and the Santa Fe at Colton.

Q. When your inspection reveals safety appliance defects, what do you do with the cars?

A. Well, we cut out and set over for repairs.

Q. Before being moved?

A. Before being moved out of the yard, or if it is an important load and had to require unloading to make such repairs, why, the car would be sent in to the unloading track with instructions to all concerned as to what the defect was.

Q. Then the car would not be moved away from Los Angeles without being repaired?

A. No.

Q. Do you maintain inspection forces other than at Los Angeles and Colton for the purpose of inspection of cars in trains?

A. No.

Q. You don't maintain any force at Santa Barbara?

[fol. 2972] Or Indio?

A. No, we have, I might say, repairmen at that point.

Q. Do they make inspection of trains on arrival or prior to departure?

A. No.

Q. What is the purpose of maintaining car repairmen at those points?

A. Any defect or any damage through accident otherwise, such as water cars or maintenance of way cars on that district that require attention, or cars such as experience a cut journal, it would be necessary to change a wheel out any time, they would be changed out and these forces would be used for such attention.

Q. Are they in the nature of forces for emergency or running repairs?

A. Yes, emergency repair forces.

Q. Have you used the dynamometer car on the Los Angeles division for the purpose of obtaining tonnage rating, Mr. McDonald?

A. Yes, they have used it there.

Q. Recently?

A. No, not recently. They used it for obtaining efficiency ratings on GS engines, the difference between an engine lubricated with oil and lubricated with grease; the [fol. 2973] driving parts of it.

Q. But only for the purpose of obtaining the results of different types of lubrication?

A. Yes.

Q. And not for the purpose of obtaining different engine ratings. By the G. S. locomotive you mean a 4400?

A. Yes.

Q. That is a passenger type?

A. Yes, sir.

Q. What is the wheel arrangement?

A. 4-8-4.

Q. I take it that the dynamometer car may be used for other purposes in connection with locomotives than merely to obtain tonnage ratings?

A. Yes, sir.

Q. What are some of these other results that can be obtained?

A. Well, efficiency and fuel consumption.

Q. Water consumption?

A. Yes, water, of course, that fits in with fuel.

Q. The results of lubrication?

A. And lubrication, yes, on friction, journal friction.

Q. Is the use of a dynamometer car necessary in order [fol. 2974] to determine tonnage rating, or can you arrive at tonnage rating without it?

A. A locomotive is designed for certain tractive effort, and if there is any question or any difficulty experienced in a locomotive handling that allowed tonnage, why, the dynamometer car is called into use for a test to ascertain why the locomotive will not handle the allotted tonnage.

Q. Then it is used more as a check than for the purpose of determining the rating in the first instance, is that correct?

A. That is right.

Mr. Mason: That is all. You may cross-examine.

Mr. Strouss: No questions.

(Witness excused.)

Mr. Mason: We will now call Mr. Judson.

Mr. Booth: If the Court please, Mr. Judson is the last of our witnesses on what I term the first branch of our case. He would have been on the stand before, but he was called away from Tucson when he was here formerly.

[fol. 2975] W. W. Judson was called as a witness on behalf of the defendant and, being first duly sworn, testified as follows:

Direct examination.

Mr. Mason:

Q. Will you please state your name and residence, Mr. Judson?

A. W. W. Judson, St. Paul, Minnesota.

Q. Are you employed by the Northern Pacific Railway Company?

A. Yes, sir.

Q. In what capacity?

A. General manager of lines east.

Q. What has been your experience with the Northern Pacific, and in railroad service generally, Mr. Judson?

A. I have been with the Northern Pacific for 26 years in various positions, in the engineering department to start with, special assistant to the vice-president, train master, assistant general manager, superintendent, and general manager.

Q. As general manager of lines east, how far does your jurisdiction extend?

A. As far west as Livingston, Montana.

Q. Does that include all of the lines west of St. Paul [fol. 2976] and Ashland, Wisconsin?

A. Yes, sir.

Q. In your prior positions in the operating department, has your jurisdiction, or the scope of your duties extended to all parts of the System?

A. Yes.

Q. Will you say whether or not you are familiar as an operating officer with the entire system of the Northern Pacific?

A. I am.

Q. I take it, you have travelled over it many times?

A. Yes, sir.

Q. As general manager, do you now travel over the lines frequently?

A. Yes, sir, the lines east.

Q. There has been heretofore offered for identification a map in one sheet marked as Defendant's Exhibit No. 50,

witness Gregory, which is, according to its title, a map of the Northern Pacific Railroad Company. Have you previously seen a copy of that map, Mr. Judson?

A. Yes, sir.

Q. Will you say whether or not it is a reasonably accurate outline of the Northern Pacific Railway Company lines [fol. 2977] and the territory which it serves?

A. I believe so.

Q. And indicates the principal points with reasonable fidelity as to location?

A. Yes, sir.

Mr. Mason: We offer the exhibit as Defendant's No. 50.

Mr. Strouss: The same objection as made to the previous exhibits from foreign roads.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked, "Defendant's Exhibit No. 50.")

Mr. Mason: Mr. Judson, in your trips over the line, do you ride entirely in passenger trains?

A. No, sir.

Q. Do you ever ride in freight trains?

A. Yes, sir, passenger trains, freight trains and special trains.

Q. When you ride in a freight train, do you use a business car?

A. Usually.

Q. Where do you have it placed on the train?

A. Usually on the rear end, but I have ridden behind the locomotive.

Q. Do you make any selection of the type or size of freight [fol. 2978] train to which the car is to be attached?

A. No, not as to size, the nature of the train usually.

Q. You prefer a through train to a local?

A. Oh, no, but there is usually some reason for riding the freight train. Often, it is the more important train.

Q. Do you make any distinction as to length of the train, whether it be over 70 cars, in attaching your business car?

A. No, sir.

Q. Will you say whether or not you have made trips in your business car attached to the rear end of freight trains of substantially more than 70 cars?

A. Yes, sir, I have.
Q. How frequently?
A. Oh, maybe once or twice a year.

Mr. Strouss: The record may show that my objections are going to this.

The Court: Yes, the record may show the running objection that the State heretofore made to the testimony of these witnesses from other roads.

Mr. Mason: Mr. Judson, does the Northern Pacific Rail-[fol. 2979] way Company's operating department have a book of rules for the guidance of transportation department employees?
A. They do.
Q. Is that a printed code?
A. It is.
Q. Issued to employees for their guidance?
A. Yes, sir.
Q. Are you familiar with the standard code of rules of the Association of American Railroads?
A. In a general way.
Q. Will you say whether or not the Northern Pacific Rule Book corresponds to the Association Code?
A. It follows it very closely, not exactly the same. There are certain rules that are some different.
Q. Is the main line of the Northern Pacific equipped with block signals?
A. Yes, sir.
Q. Throughout?
A. Yes, sir.
Q. Will you describe them as to type?
A. We have the older type which on the Northern Pacific is the upper quadrant three position arm, the newer type [fol. 2980] are the three color light signals, the later installations.
Q. You use either one or the other over the entire main line, do you?
A. Yes, sir.
Q. Do you have any installation of cab signals on the line?
A. No, sir.
Q. Any centralized traffic control?
A. No, sir.
Q. Is your line predominantly double track or single track?

A. Predominantly single track.

Q. You have stretches of double track?

A. Yes, sir.

Q. Where are the stretches of double track found?

A. Well, they are in various locations. There is double track out of St. Paul to Staples, and from Staples to Fargo. Fargo is not shown on this map.

Q. Fargo is at the point where your line enters North Dakota, is it not?

A. Yes, sir, right on the line. Then double track on the mountain from Livingston to Logan with the exception of the Bozeman Tunnel. There is double track from Garrison [fol. 2981] to Missoula. There is double track from Seattle to Portland, and a few other small locations, I mean a few other small mileages at other locations.

Q. I take it that the double track is largely in the neighborhood of important division terminals?

A. That is right.

Q. This line from Seattle to Portland, is that the line used jointly with the Union Pacific and the Great Northern?

A. It is.

Q. Mr. Judson, I will ask you to refer, if you will please, to Defendant's Exhibit 2. Have you heretofore been furnished with a copy of that exhibit?

A. I have.

Q. First I will ask you if you are generally familiar with the freight equipment owned and used by the Northern Pacific?

A. I am.

Q. Will you say whether or not the development in the construction of the boxcars of the Northern Pacific has proceeded along lines substantially similar to those indicated by Exhibit No. 2?

A. Very much the same. The dates of changes are in [fol. 2982] some cases different, and all of the new features as shown in the column here have been adopted by the Northern Pacific with the exception of, I believe, only two. We have no metal running boards on the boxcars and we have no steel floor plates as yet. Other than that I can find nothing in here that is different.

Q. Does the Northern Pacific now have in revenue service any cars with wooden underframes?

A. Yes, I believe so.

Q. You have some wooden underframe cars still in service?

A. Yes, sir.

Q. Are they restricted to particular localities?

A. Yes, particular service.

Q. What are the localities and service to which they are restricted?

A. They are used for outfits, work outfits, and there are some used in company material service.

Q. If they are handling company material or work outfits, they are not strictly in revenue service, are they?

A. No, that is right.

The Court: Do you have any such wooden underframe cars in revenue service?

A. I don't recall any. We did have, but I don't think [fol. 2983] so, now.

Mr. Mason: Will you refer, please, to exhibit No. 4, and state whether or not the development of the passenger carrying cars of the Northern Pacific has proceeded along substantially the same lines as indicated by Exhibit No. 4?

A. It is up to the point of the articulated car, articulated unit, or the single unit of stainless steel, we have none of that class.

Q. Your standard passenger carrying car is now the steel car of more or less conventional type, is it?

A. Yes, sir.

Q. Do you still run in main line passenger service any cars not of steel construction?

A. Yes, sir.

Q. In main line passenger service?

A. Yes, sir, under certain conditions.

Q. Do those cars ever leave the lines of the Northern Pacific?

A. No, sir.

Q. Does the Northern Pacific operate Pullman cars in its passenger trains?

A. Yes, sir.

Q. Are those of the same general type that are in use on [fol. 2984] other railroads as you have observed them?

A. Yes, with the exception that we do not have the newer stainless steel cars used in streamlined trains, we don't have streamlined trains.

Q. Do you operate Pullmans in through service jointly with other railroads?

A. Yes, sir.

Q. Will you refer, please, to exhibit No. 5, which shows the development of freight locomotives for the Southern Pacific?

A. Yes, sir.

Q. Do you have, or have you previously had in service on the Northern Pacific freight locomotives corresponding generally to those shown on Exhibit No. 5?

A. Well, generally so, yes. There are some types here that we don't have.

Q. Have you had a Consolidation Type of Locomotive, or do you now have one?

A. Yes, sir.

Q. And with tractive effort substantially the same as indicated here, or something different?

A. A little bit heavier than the heaviest shown here.

Q. I was referring to the Consolidation type, the two at the top of the sheet.

[fol. 2985] A. Oh, the Consolidation type.

Q. Have you had those locomotives in service?

A. Yes, sir, about the same type, a little bit less tractive effort.

Q. Have you used the Mikado locomotive?

A. Yes, sir.

Q. Do you use the 2-10-2 type?

A. No, sir.

Q. Either large or small, shown here?

A. No, sir.

Q. What is your heaviest freight locomotive now in service?

A. It is an articulated simple Mallett 2-8-8-4 wheel arrangement.

Q. And what is the tractive effort?

A. 140,000 without the booster, and 153,000 with the booster.

Q. As a 2-8-8-4 it corresponds in wheel arrangement to the A. C. 9 shown on this exhibit then?

A. Yes, sir.

Q. Do your locomotives use coal for fuel or oil?

A. We have a few oil-burning locomotives on the west coast, otherwise they are all coal burning.

[fol. 2986] Q. Are your coal-burning locomotives in main line service equipped with automatic stokers?

A. Yes, sir.

Q. Are they equipped with power reverse gears?

A. Yes, sir, practically all of them; they are not all of them, all the larger ones in main line service are.

Q. With super heaters?

A. Yes, sir.

Q. Feed water heaters?

A. Yes, sir.

Q. What type of brake equipment is applied?

A. I couldn't tell you that.

Q. Other than your articulated type of locomotive, what type of freight locomotives do you use principally in freight service?

A. The Mikado, we have two of the articulated Malletts though, we have a 4-6-6-4.

Q. What is the tractive effort of the 4-6-6-4?

A. About 104,000.

Q. Then your Mikados, what is their size from the standpoint of tractive effort?

A. About sixty-three, between sixty-three and sixty four thousand.

Q. Now, looking at Exhibit No. 6, have you any locomotive types in passenger service now or have you had in the [fol. 2987] past, which correspond or resemble those shown on Exhibit No. 6?

A. Yes, we have the ten-wheeler 4-6-0, we have the Pacific type, and the Golden State type as shown on this exhibit.

Q. You call the Golden State type by some other name, don't you?

A. Yes, we call it the Northern.

Q. It has the same wheel arrangement as this?

A. 4-8-4, yes.

Q. How do your 4-8-4 locomotives compare in tractive effort?

A. About 5000 more. It is a 69,000 locomotive.

Q. Your Pacific type locomotives, are they larger or smaller than those shown?

A. Very similar, within a few thousand pounds of what is shown here, I believe.

Q. Do you run refrigerator cars in the freight trains, on your railroad?

A. I didn't hear the question.

Q. Do you have refrigerators in the freight trains on your railroad?

A. Yes, sir.

Q. What is the identification of the refrigerator cars principally in use?

A. N. R. C. cars, Northern Refrigerator cars.

[fol. 2988] The Court: Mr. Mason, I don't presume you will be able to finish the direct examination.

Mr. Mason: No.

The Court: The court will be at recess until two o'clock.

(Thereupon, the court stood at recess until two o'clock, P. M. this day.)

[fol. 2989] 2 P. M., January 24, 1941

All parties being present as heretofore noted, proceedings were resumed as follows:

W. W. Judson resumed the witness stand.

Mr. Mason:

Q. Mr. Judson, do you have Pacific Fruit Express Company cars on your railroad from time to time?

A. We have a few of them, yes, but we don't use them ourselves.

Q. Do your N. R. C. cars resemble the P. F. E. cars?

A. I think so, yes.

Q. You once in a while operate cars of Southern Pacific ownership?

A. Oh, yes.

Q. Your Northern Pacific cars from time to time move over Southern Pacific lines, do they?

A. Yes, sir.

Q. About what are the length of the runs of your freight locomotives in main line service?

A. Well, it varies from 100 miles to 300 miles.

Q. Where would the 300-mile run take place?

A. We have one from Northtown, that is the freight terminal at St. Paul, to Mandan.

[fol. 2990] Q. That is in the western part of North Dakota, is it not?

A. Yes, it is 106 miles east of Dickinson shown on the map. That is our longest freight engine run and that is being operated now as an experiment and that is about 600 miles. The 300 miles I mentioned before was our regular operation, but this particular one is 600 miles.

Q. In a general way, Mr. Judson, will you describe the nature of the traffic carried by the Northern Pacific, first, eastbound on its main lines.

A. For the most part eastbound, it is grain, fruit, live stock, lumber. I believe that covers the principal commodities.

Q. Is that generally a through main line movement from origin territories to eastern destinations or interchange points?

A. Yes, sir.

Q. What is the general character of the westbound movement?

A. General freight westbound and a large empty car movement westbound.

Q. Is the movement of loaded freight heavier eastbound than westbound, generally speaking?

A. Heavier eastbound.

[fol. 2991] Q. Do you have any substantial westbound movement of empty refrigerator cars?

A. Yes, sir.

Q. As well as empty boxes?

A. Yes, sir.

Q. Do you handle any substantial amount of mineral traffic, products of mines?

A. Yes, sir, but not in through movement over the entire line of the railroad.

Q. You serve a mineral-producing territory in Idaho and Montana, do you not?

A. Yes, sir, and also in Minnesota.

Q. Do you have some coal movement out of North Dakota?

A. Yes, sir, a large coal movement.

Q. Does the Northern Pacific maintain or participate in schedules for the handling of freight eastward and westward?

A. I don't know as I understand your question.

Q. Do you have published over-all time schedules for freight from your western terminals to your eastern interchange points?

A. Yes, sir.

Q. For example, do you have a schedule from a point such as Seattle and Tacoma to the Twin Cities?

[fol. 2992] A. Yes, sir.

Q. Will you state the over-all time that you observe for those schedules from the western terminals to eastern points?

A. I would have to check that up; over the entire railroad I can't say offhand. It is comparable, though, to the schedules of the other northern lines.

Q. You maintain substantially the same scheduled over-all time as the Great Northern, for example?

A. Yes, sir.

Q. Do you maintain westbound schedules of the same character?

A. Yes, sir.

Q. And on a competitive basis with the Great Northern?

A. And the Milwaukee and the Union Pacific.

Q. Have you before you, Mr. Judson, an exhibit in one sheet entitled, "Northern Pacific Railway Company, Typical Examples of Freight Trains Handled," and so forth?

A. Yes, sir.

Mr. Mason: Your Honor, may we have this exhibit marked with the next number in order?

The Court: It may be marked.

[fol. 2993] The Clerk: Defendant's exhibit No. 207 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 207 or cause it to be prepared?

A. Yes, sir.

Q. From what sources was it prepared?

A. From the train sheet record of the train movements.

Q. As to the ruling grades shown in column D, from what is that taken?

A. From our track profiles and from the time cards.

Q. Do you have with you in the courtroom the dispatchers' train sheets to which you have just referred?

A. I have.

Q. And track profiles as well?

A. I have.

Q. Do you also have the current operating timetables?

A. I have.

Q. Does exhibit No. 207 for identification show all trains operating between the points indicated in columns A and B during the period referred to?

A. Yes, sir.

[fol. 2994] Q. That would include local trains which operate less than the entire distance as well as those which operate between the termini?

A. That is correct.

Q. Has the exhibit been compared against the underlying sources to determine its correctness?

A. Yes, sir.

Q. Will you say whether or not it is true and correct?

A. It is correct.

Q. I notice that the period shown as October 1 to 10, inclusive, 1939. Did you select that period for the purposes of this study?

A. Yes, sir.

Q. Why did you select it?

A. It is a representative period and it has been used quite frequently on our road for similar studies.

Q. Does it represent a fair cross-section of the traffic handled during the month of October?

A. Yes, sir.

Q. Does the month of October represent a fair cross-section of the traffic for the year?

A. October is a little higher than the other months of the year, the fall months are the heavier months.

[fol. 2995] Q. This would be a period, then, of better than the annual average of traffic, would it?

A. That is correct.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: I have no questions.

Mr. Mason:

Q. Mr. Judson, are the underlying documents to which you refer available for the use of opposing counsel if they desire in examining the exhibit or for cross-examination?

A. Yes, sir, they are the original and only record.

Mr. Mason: Your Honor, we tender these records for the use of opposing counsel in connection with exhibit No. 207. We offer the exhibit in evidence with that number.

Mr. Strouss: The same objections as heretofore given to similar exhibits of foreign roads.

The Court: The objection is overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 207.")

[fol. 2996] Q. Referring to Exhibit 207, Mr. Judson, are any of the districts shown in the "From" and "To" columns on the exhibit, columns A and B, double track territory?

A. Yes, sir.

Q. Which one?

A. From Lixingston to Logan is partially double track. From Helena to Missoula is partially double track, Missoula to Garrison is double track.

Q. And from Dickinson to Glendive?

A. That is single track.

Q. That is single track. Now, I will ask you to refer, in connection with exhibit 207, to Defendant's Exhibit 50. Does the heavy line shown on Exhibit 50 indicate the districts which are refefred to on Exhibit 207?

A. They do.

Q. Are any of these districts shown on Exhibit 207 helper districts?

A. Yes, sir.

Q. Will you indicate which ones?

A. Between Livingston and Logan, partial helper district, between Logan and Livingston partial helper district in the other direction, betwen Helena and Logan is partially [fol. 2997] a helper district, and Helena to Missoula is partially a helper district. That is all.

The Court: I notice, Mr. Judson, that practically all of the operations shown on this exhibit No. 207, are covering operations in the state of Montana. In view of the fact that your lines cover quite a number of states, is there any particular reason for selecting the Montana area rather than the other districts of your road?

A. The districts selected have been used in many studies on the Northern Pacific. The one between Dickinson, North

Dakota, and Glendive, Montana, is the district used because it represents the districts where we use our heaviest Mallett types. The district between Livingston and Missoula is a mountain operation.

Mr. Strouss: When you were answering as to double track, I notice there were certain places like Bozeman, Montana, to Logan, that would be double track, or would it? I noticed you said Livingston to Logan was partially double track. Now, Bozeman is in between.

A. Well, between Livingston and Bozeman is double track. Between Bozeman and Logan it is single track, alternate line operation, there are two lines between Bozeman and
[fol. 2998] Logan, a freight line and passenger line, but it is not double track.

Mr. Mason: Mr. Judson, while this exhibit relates only to the districts shown in heavy line on Exhibit No. 50, I will ask you whether or not trains in excess of 70 cars are operated on other portions of the System as well?

A. Yes, and to a greater extent.

Mr. Strouss: It is understood my objection is going to the testimony without it being repeated.

The Court: Yes, that is understood.

Mr. Mason: I think, with reference to your testimony on locomotives, no discussion was had of the Northern type. You show a Northern type locomotive on exhibit 207 in column E. What is the Northern type?

A. The Northern type is the 4-8-4 passenger locomotive. At this time, in 1939, the Northern type were used entirely in passenger service. We have since that time put them into freight service, and this particular one shown on exhibit No. 207 was a locomotive out of the shop which was being broken in or it handled a small train that happened to be probably a stock train, something of that kind.

Q. Did you state the wheel arrangement of these Mallett locomotives?

[fol. 2999] A. One is between Glendive and Dickinson, which is the larger of the two, is a 2-8-8-4 wheel arrangement. The one between Livingston and Helena and between Helena and Missoula is a 2-6-6-4.

Q. What is the tractive effort of the 2-6-6-4?

A. About 104,000.

Q. And the other, I think you stated, is something in excess of 130,000?

A. 140,000 and 153,000 with the booster.

Q. These are an articulated type?

A. Yes, sir.

Q. Have you before you, Mr. Judson, a statement in one sheet entitled "Northern Pacific Railway Company, Maximum Number of Cars Handled in Various Main Line Passenger Trains, October 1st to 10th, 1939, Inclusive?"

A. I have.

Mr. Mason: May we have this exhibit marked as defendant's Exhibit No. 208 for identification?

The Court: It may be marked for identification.

The Clerk: Defendant's Exhibit No. 208 for identification.

Mr. Mason: Did you prepare this exhibit, Mr. Judson, or have it prepared?

A. I had it prepared and checked it.

[fol. 3000] Q. From what sources was it prepared?

A. From the train sheet record of the train movements, and also from the conductors' reports of cars sent out and picked up.

Q. Are those records likewise available in the court room?

A. The train sheet records are.

Q. And is all of the information shown on the exhibit likewise shown in detail on the train sheet records?

A. Yes, sir.

Q. Has the exhibit been compared with the original records to determine its correctness?

A. Yes, sir.

Q. Will you state whether it is true and correct?

A. It is.

Q. As to these mileages, are they likewise shown?

A. Yes, sir—on the train sheet?

Q. Yes.

A. No, they would have to be added up off the train sheet. They don't show any one mileage as shown on the statement.

Q. From Fargo to Billings, you would have to add up from three or four train sheets, for example?

[fol. 3001] A. Yes, sir.

Mr. Strouss: That is shown on your timetable, I take it.

A. Yes.

Mr. Mason: Why do you select these particular districts, as shown in column B?

A. May I correct one of my statements?

Q. Yes.

A. This exhibit is a System exhibit for the entire system. The train sheets are not here for the entire system. I will have to correct that, they are here for the freight exhibit and not for the passenger exhibit.

Q. Have you the passenger conductors' reports covering these trains?

A. No, sir, I haven't.

Mr. Strouss: I will say to you I will waive that objection to that.

Mr. Mason: Very well.

Q. Now, why did you select these particular points to show the study of the train; for example, you show one train, but show its consist from point to point over eight different districts?

A. These are the places at which the train was broken up and cars either taken from it or added to it.

[fol. 3002] Q. Are these the points at which the changes in consist are customarily and regularly made, if made at all?

A. Yes, sir.

Q. Did you likewise make the selection of the period stated on exhibit No. 208 for identification?

A. Yes, sir.

Q. Why did you select this particular period for study in connection with passenger trains?

A. Well, because we just took the same period that we took for the freight.

Q. Is the period October first to tenth heavier than average period, so far as concerns passenger traffic?

A. It is lighter than average.

Q. Is it fairly representative of the month of October?

A. It is.

Q. Now, are the trains shown as No. 1 and 2 companion trains, one eastward and one westward?

A. Yes, sir.

Q. What is the name of that train?

A. That is what we call the North Coast Limited.

Q. Are the trains No. 3 and 5 likewise companion trains?

[fol. 3003] A. They are.

Q. What is the name of those trains?

A. Formerly called the Alaskan, but we don't use that name any more, we don't have any name for it now.

Q. Are there any other through transcontinental trains from the Twin Cities to Seattle operated over the Northern Pacific?

A. No, sir.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: I want to say we appreciate the courtesy of opposing counsel in waiving the production of the underlying passenger train records for this exhibit. We offer the exhibit in evidence as Defendant's Exhibit No. 208.

Mr. Strouss: The same objection, except the objection as to the competency is waived.

The Court: Overrule the objection. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 208.")

Mr. Mason: Mr. Judson, do trains Nos. 1 and 2 carry head-end cars as well as passenger-carrying cars?

A. They do.

[fol. 3004] Q. Now, you show, for example, No. 2, Butte to Billings, with a consist varying from 15 to more than 17 cars in that train over that stretch. How many cars, generally speaking, would be other than passenger-carrying cars?

A. Oh, on the average of about four.

Q. Does that proportion generally obtain throughout the run of the train from Seattle to St. Paul?

A. No, I think the through run will probably average nearer three on the through run.

Q. Does the train also carry coaches?

A. Yes, sir.

Q. And a dining car?

A. Yes, sir.

Q. And standard or tourist Pullmans?

A. Both.

Q. Do trains Nos. 3 and 4 carry the same class of equipment?

A. No, sir, they don't carry any standard equipment on the through run, they don't carry a diner, they have a cafe

coach instead, and they do not have any observation car.

Q. Do Nos. 3 and 4 carry any greater number of head-on cars?

A. Yes, sir.

[fol. 3005] Q. What sort of weather do you get along your line across North Dakota, Montana, and Minnesota in the winter-months?

A. Well, it is very severe. I have railroaded in Montana at 56 below.

Q. Is that a regular experience every winter?

A. No, that is an exceptional case.

Q. Does the temperature descend below zero frequently during the winter?

A. Yes, I have seen it for more than a month at a time when it never got above zero.

The Court: You don't have Tucson weather in your territory?

A. No, not anywhere near approaching it.

Mr. Mason: I notice that you have at times here operated the North Coast Limited with more than 15 cars though not, according to this exhibit, 208, during the month of January or February. Do you operate in the winter months with consists similar to those shown on Exhibit 208?

A. We do.

Q. Do you make any limitation of the length of your passenger trains because of the cold weather?

A. Yes, to make our time we have limited it to twenty [fol. 3006] cars out of Twin Cities. We have that quite frequently, but that is to enable us to make the scheduled time.

Q. Is that for the purpose of reducing tonnage to conform to the rating of the locomotive?

A. Well, it is more to comply with the weather conditions. The locomotive will handle more, but when the wind is blowing, and snowing hard, we cut the tonnage down so as to enable us to make the time.

[fol. 3007] Q. Is that because of wind resistance?

A. Partly.

Q. Do you make any reduction of your passenger trains to any particular length because of the problem of heating the rear cars of the train?

A. No, because we in general hold them down to twenty cars and we have never had any trouble with that number.

Q. Mr. Judson, in general what considerations determine the lengths of the freight trains that you operate?

A. There are several factors, the physical characteristics of the districts over which they operate; the class of train, that is, whether it is an expedited freight train or otherwise; and the business offered for handling and the weather conditions.

Q. You speak of the character of the district over which it is operated. By that you mean the grades that you are to encounter?

A. Yes.

Q. Does that mean you adjust the tonnage of the train in accordance with the available power to handle it?

A. Yes, sir.

Q. And that, in turn, determines the length?

[fol. 3008] A. That is correct.

Q. Now as to the matter of expedition, do you again adjust the tonnage in accordance with the engine rating for faster or slower movement?

A. Well, on what we term our time freights we don't run as heavy a tonnage as we do on what we call the drags, coal drags, with the same power.

Q. Will you say whether or not the adjustment of the train is a matter of adjusting the tonnage rather than as to the number of cars?

A. It is entirely a tonnage proposition. Of course two trains of the same tonnage would make some difference but we adjust and operate on a tonnage basis.

Q. Not to the number of cars?

A. No, sir.

Q. You spoke of weather conditions, do you have in mind wind resistance as a factor in the operation?

A. Wind resistance, snow, slippery rail, sleet, all weather conditions that would tend to retard a train.

Q. Will extreme cold weather cause you to reduce tonnage?

A. Yes.

Mr. Mason: I think that is all, thank you, Mr. Judson. [fol. 3009] Do you wish to cross-examine now or would you rather have the train sheets first, Mr. Strouss?

Mr. Strouss: I prefer to see the train sheets first.

Mr. Mason: Your Honor, may the record show we have handed to opposing counsel the train sheets which form the basis for the information generally shown on exhibit No. 207 together with the operating timetables of the Northern Pacific.

The Court: The record may so show.

Mr. Mason: And that Mr. Judson is to be recalled for cross-examination after Mr. Strouss has had the opportunity to examine those documents.

(Witness excused.)

H. C. Garverick was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Mason:

Q. Will you state your name and residence to the reporter?

A. H. C. Garverick, San Francisco.

Q. Are you employed by the Southern Pacific Company? [fol. 3010] A. I am.

Q. In what capacity?

A. At the present time I am connected with the Bureau of Transportation Research.

Q. Have you been employed by the company as a timekeeper in the accounting department?

A. For the past thirty-one years.

Q. Were you ever timekeeper at the headquarters of the Tucson division?

A. I was.

Q. What years?

A. I entered the service in the year 1910 at Tucson as an accountant and remained in that position until some time in the year 1912. I was timekeeper from 1912 to 1915; 1915 to 1918 as head timekeeper; 1918 to 1922, back to San Francisco in the auditor of disbursements office as an accountant; from 1922 to 1927 I was timekeeper on the Sacramento division; from 1927 to 1932, assistant head timekeeper, Sacramento division. In the year 1932 they consolidated seven timekeeping divisions under the supervision of the auditor of disbursements at San Francisco,

and I was transferred to San Francisco and made head clerk in charge of one of the timekeeping subdivisions [fol. 3011] which was broken up into four or five divisions, one division being train and engine and yard; another division being broken up into maintenance of way; another division broken up into motive power and car department; and another division broken up into station force and telegraphers.

Q. Will you continue with your experience up to date?

A. That was in 1932. From 1932 to the present date I have been assigned various duties. I was disengaged temporarily from my duty as head clerk to that of clerk in charge in the preparation of statements for the Federal coordinator and in the preparation of back payrolls. Right at that time there were numerous decisions from labor tribunals which required the payment of back pay to both train, engine, and yard men for all divisions, I might say, with the exception of the Tucson and Rio Grande.

Q. That was computed at El Paso, I take it?

A. They were consolidated, Tucson and Rio Grande divisions were consolidated practically about the same time at El Paso. It was not in the jurisdiction of San Francisco, due to the long distance in preparing payrolls, and a short payroll period time in getting out pay checks, as [fol. 3012] the Arizona law was shorter than the California.

Q. Since 1932 and up to 1939 have you been engaged in a series of special duties in the office of the auditor of disbursements in connection with payrolls and payroll accounts?

A. Payrolls, payroll accounts, special statements, also the initial preparations for the government in the pension department and setting up their wheels of machinery for the railroad pension fund; also for the state of California for the California unemployment insurance.

Q. Have you in the course of your experience become familiar with the manner in which the rates of pay for trainmen and enginemen are arrived at and applied in computing their wages?

A. I have been in constant touch with the trainmen and enginemen and yardmen's agreement since I entered the service of the railroad.

Q. Have you used the provisions of those agreements for the purpose of setting up the wages of the individual trainmen and enginemen?

A. Yes, sir, I have.

Q. Are you familiar with the rates of pay heretofore and presently in effect in the various districts of the Tucson and Rio Grande divisions?

A. I am.

[fol. 3013] Q. Have you before you a statement in one sheet entitled, "Basic Rates of Pay for Standard Days and Certain Runs on the Tucson and Rio Grande Divisions"?

A. I have.

Mr. Mason: May we have this statement marked as "Defendant's Exhibit No. 209"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 209 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 209 for identification, Mr. Garverick?

A. I did.

Q. From what sources?

A. This exhibit was prepared from the working agreements of both the train and enginemen, current train and enginemen's agreements in effect as of today.

Q. Does this undertake to show the rates of pay as in effect upon the various districts of the Tucson and Rio Grande divisions for the various services which are indicated here?

A. It does.

Q. Do you have the basic agreements from which this information is taken available in the courtroom?

[fol. 3014] A. Yes, sir, I have.

Q. Is the exhibit merely a summary of the provisions as they appear in those agreements?

A. Yes, sir, it is.

Mr. Mason: I take it that opposing counsel will not require the production of these basic agreements, they are matters of very wide circulation.

Mr. Strouss: No.

Mr. Mason: If you do not object, I will supply the witness's copy to the judge so he may follow the testimony.

Mr. Strouss: All right.

Mr. Mason: Your Honor, I am placing before you the agreements governing the conductors, trainmen, firemen, and engineers for the Southern Pacific Company which are currently in effect and I will ask the witness, are the agreements which you produced and which I have placed before the Court the agreements for the several crafts; those four crafts mentioned, which are now in effect?

A. The agreements are still in effect.

Q. Are the rates of pay which are in effect today and which were in effect in 1938 shown in the copies which have been placed before the judge?

A. I might state that the conductors, as shown on the [fol. 3015] face, will show that it was in effect somewhere in 1939. The trainmen are in 1939, the firemen are in 1939, and the engineers is in process of being printed today with the current rates. You will see that the rates shown in the engineers' agreement dated back to about 1928 and there have been several increases since then. However, there have been tabulations put out by the management to bring those rates up to date, and it has been made a part of that agreement until it is made in its entirety in book form.

Q. Does the copy which was handed to the Court contain the rates which were current in 1938?

A. With the exception of the engineers' agreements.

Q. Your copy of the engineers' agreement has not been revised?

A. No, sir.

Q. There is nevertheless a revision of the printed rates, as shown in the engineers' agreement, which is effective as of 1938 and to date?

A. Yes, sir, I have a mimeographed copy of the new rates.

Mr. Mason: Mr. Strouss, I think we both understand that the printed agreement has been revised to reflect certain in- [fol. 3016] creases which became effective in 1937 and such other intermediate increases as may have been made.

Mr. Strouss: Yes.

Mr. Mason: Mr. Garverick, there are on the face of exhibit No. 209 for identification certain calculations from the basic figures which appear in the agreement, are there not?

A. Yes, sir, there are.

Q. For example, take line 3, the first item of money in column A. What does the figure in line 3, column A indicate?

A. That will represent the compensation to an engineer and fireman on a consolidation engine who have traveled 123 miles in through freight service from Yuma to Gila.

Q. Is there any figure on the exhibit which you multiply in order to obtain that figure in line 3, column A?

A. Yes, sir.

Q. What is that figure?

A. Take line 1, the basic (through), $15.04 100 miles; 15.01 per mile and multiply it by 123 you will develop $18.46.

Q. Does the figure in line 1 represent the payment to the engineer and the fireman for the service in operating the engine 100 miles?

A. Yes, sir, it does;

[fol. 3017] Q. Is that the basic day?

A. That is the basic day, one hundred miles or eight hours.

Q. Suppose that the operation is in local service, do you take the figure in line 2?

A. Line 2, which is 15.93 or $15.93 per 100 miles and multiply it by 123, as shown in item 4 between Yuma and Gila, and you will develop $19.59 for the entire trip to an engineer and fireman.

Q. I notice that you show a variation in the figures of basic wages, taking line 1, basic (through), in the various columns A to I, inclusive. Why is there that variation or increase from one column to the next?

A. Engineers and firemen are paid the rates shown in their agreement in accordance with the weight on the drivers of the various classes of power that they are operating. For instance, in column A there is a Consolidation engine; column B is a Mikado; column C is an F-1 type; column D is a Mountain type; column E is an F-3 type; column F is an F-4 type; column G is an F-5 type; column H is an SP type; column I is an AC-8 type, and as they vary with the weight on the drivers the rates fluctuate.

[fol. 3018] Q. Does the rate increase as the weight on drivers increases?

A. It does.

Q. And is that according to blocks or brackets of weights?

A. Yes, it is.

Q. For instance, is there a block or bracket between 200 and 250 thousand pounds?

A. That is the way the agreement is worked around a fifty-thousand-pound differential.

Q. If the locomotive on which the engine crew is running weighs 240,000 pounds on the drivers, they will receive the 200 to 250 thousand pound bracket, will they?

A. That is correct.

Q. If the weight on drivers is 240,000, they will be in the same bracket?

A. They will be in the same bracket.

Q. You show also a basic wage for trainmen in column K. Is that calculated from the conductors' and trainmen's agreements?

A. Yes, sir, it is.

Q. Does this include the figures of the conductor as well as the brakeman?

A. Item 1 will include the conductor and three brakemen.

[fol. 3019] Q. Is there a variation between through and local rates in the basic?

A. That is correct.

Q. How do you obtain the figure, for example, in line 3, column K?

A. If you will refer to the bottom of the form under the caption "Conductors' and trainmen's rates of pay," it will be noted that the freight districts on the Tucson division vary in rate per 100 miles or rate per mile. The rate in item 4 will come under the district Yuma to Gila, Gila to Phoenix, Gila to Tucson, or Phoenix to Tucson.

Q. You group all of those in one group as west of Tucson?

A. West of Tucson.

[fol. 3020] Q. Then, in the lower bracket you show the rates for the conductor and the rates for each trainman, do you?

A. Yes, sir.

Q. And you group them in line 1 as one round sum for the four men?

A. Yes, for the miles travelled between those two freight termini.

Q. And the figures then in line 3 are simply a multiplication of 123 miles times the rate shown, taking 100 miles shown in line 1?

A. Yes, sir.

Q. And the same for the others down to and including line 10?

A. That is correct.

The Court: Did I understand you to say that the figure over in column K represented the combined pay of the conductor and two brakemen?

A. Line K calls for three brakemen. You will notice in column J, it covers two brakemen.

Q. In other words, in this particular territory west of Tucson, there are no runs that only employ two brakemen?

A. No, there are no runs that employ only two brakemen in that territory.

Mr. Strouss: That might or might not be true, might [fol. 3021] it not?

Mr. Mason: It would depend on the length of the train. It is not figured here, Mr. Garverick, as I understand.

A. It would be possible that they could use two, but they always assign three brakemen.

Mr. Strouss: If you had a train under 40 cars, you wouldn't assign three brakemen?

A. It would have to be what we term a made-up crew. All assigned crews are assigned with a conductor and three brakemen, if they only had the caboose.

Mr. Mason: Answering the Judge's question, the figures in column K are all for the four men comprising the train crew as distinct from the engine crew?

A. That is correct.

Q. Now, turning to the district, the district shown in lines 21 and below, did you make the computations in the same manner?

A. I did.

Q. And likewise for lines 26 and 27?

A. Yes, sir.

Q. And these figures for helper crews in lines 24 and 25, are they on the basis of actual miles?

[fol. 3022] A. That is on the basis of just actual miles.

Q. Then your notation indicates a certain minimum payment?

A. Yes, ones [illegible] would mean a day's pay.

The Court: Mr. Garverick, you testified that the rate of pay of the engine men, which, as I understand it, includes

the engineer and fireman, is predicated upon the weight of the locomotive, that is, the weight on the drivers. Does the weight of the locomotive have anything to do with the basic pay of the conductor?

A. No, it doesn't.

Q. Does the tonnage of the train have anything to do with it?

A. No, it doesn't.

Mr. Mason: As I understand it, Mr. Garverick, the exhibit is divided between lines I and J into two entirely separate blocks and all of the information to the left of line I, except, of course, the columns which indicate the districts, relates entirely to engineers and firemen?

A. Yes, sir.

Q. And all of the information in column J and K relates to trainmen?

A. Yes, sir.

Q. Do I understand, Mr. Garverick, that the agreement [fol. 3023] provides a different basic rate for 100 miles for conductors and brakemen in the territory east of Tucson than prevails in the territory west?

A. Yes, there is quite a differential in there as shown at the bottom of the exhibit.

Q. You show also the rates for deadheading where these employees are moved to points to commence work?

A. Yes, sir. I might call your attention, that a conductor working between Yuma and Tucson receives $7.14 a hundred miles. Now, if that train conductor would work east, Tucson to Lordsburg, he would receive $7.43 for one hundred miles.

Q. That is in through freight service?

A. Through freight service.

The Court: The only reason for that is, that that is the agreement between the brotherhoods and the railroads?

A. That is the agreement. It has been decreased and increased as increases have been paid through different wage controversies.

Mr. Mason: Has the exhibit been compared against the agreements to determine its correctness, Mr. Garverick?

A. It has.

[fol. 3024] Q. Will you say whether or not it truly and correctly reflects the rates of pay shown in the agreements

and, as to the particular districts to which reference is made, the rates payable for the services indicated according to the agreements?

A. I have checked it and it is absolutely correct.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit 209.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked, "Defendant's Exhibit No. 209.")

The Court: Well, now, Mr. Garverick, I noticed east of Tucson, as shown by this exhibit, at least in two areas, the El Paso-Lordsburg and the El Paso-Strauss turnaround, that apparently trains are operated with conductor and two brakemen?

A. Yes, between El Paso and Strauss and between El Paso and Lordsburg.

Q. That again is a matter of agreement.

A. That is a matter of agreement and also state laws.

Mr. Strouss: Of course, we are getting into something [for 2025] now at this time—as a matter of fact, I think counsel will admit there is no full-crew law in New Mexico.

Mr. Mason: I understand there is no full-crew law in New Mexico, and trains may be operated in New Mexico with less than three brakemen, but the showing is merely of the amount which would be payable without undertaking to discuss what the requirements might be, the amounts payable for those particular services.

The Court: Then the answer to it, Mr. Strouss, is the difference in the laws of the two states?

Mr. Strouss: I assume it has some effect.

Mr. Mason: I didn't undertake to qualify the witness as to whether we do operate or do not operate. The figures are merely here to show that those payments would be made if the circumstances arose in that way.

Mr. Strouss: Yes, I understand.

Mr. Mason: Mr. Garverick, I ask you to refer to the exhibit heretofore marked as No. 198 for identification when Mr. Sines was on the stand. In the course of his testimony,

Mr. Sines stated that certain of the entries on this exhibit had been made by yourself. Now, will you point to the portions of that exhibit which represent entries made [fol. 3026] by you on the original white work sheet A, of which this is a reproduction?

A. All entries were made by me personally from columns 16 to 27 inclusive.

Q. Now, from what source did you take the information from which you made the entries in the actual half of the sheet, that is, the half above the line which crosses the sheet just above the word "redispatch" in columns 16 to 27?

A. From Form 2370, time returns and delay reports, originally rendered by either the conductor or the engineer who made the trip.

Q. Are those original time returns and delay reports covering the operation of these actual trains?

A. That is correct.

Q. You took simply the amounts shown on the face of those time returns and delay reports as claimed by the conductors and engineers as wages of themselves and crews?

A. That is correct.

The Court: Do I understand from that, Mr. Garverick, that each day as the trainmen complete their day's work, they turn in a slip with the number of hours that they have worked, and the amount of pay that they claim is due?

[fol. 3027] A. Yes, turn in what we term a Form 2370 Time Return and Delay Report.

Mr. Mason: I show you, in connection with the Court's question, sheet 5 of Exhibit No. 195. Will you advise the Court whether that is the form to which you have reference?

A. That is the form that I have reference to, an identical form for both engineer, trainman and yardmen.

Q. Is that sometimes known as the time slip?

A. Known as the time tag, as we call it, or time slip.

The Court: That answers the question.

Mr. Mason: Was the information shown in the columns to which you have referred in so far as exhibit 198 for identification is concerned checked against the original time cards and delay reports?

A. They were originally transcribed from the 2370 time return and delay report and checked against the current rates of pay.

Q. Did you perform the same character of work on each of the other white work sheets A, which were prepared as testified by Mr. Sines?

A. I did.

Q. Using in so far as the actual half of those sheets is [fol. 3028] concerned the original time returns and delay reports?

A. Yes, sir.

Q. Now, from what source and in what manner did you make the entries in the column 16? Taking column 16 as an example in the half of the exhibit below the line separating the actual from the redispatch.

A. Well, the first information which we must have at hand in making allowances for train engine is the class of power that they are operating with and the first item under the redispatch, this engineer and fireman used a 4100 class AC-8 engine. That engine weighing more than 550,000 pounds on the drivers calls for a rate that I have indicated on Exhibit 209 as $17.82 per 100 miles or 17.82 cents per mile for an engineer and a fireman. We multiply by the distance travelled, which was 164 miles from Tucson to Lordsburg, will develop $29.23.

Q. Is that the figure shown for the AC-8 Class locomotive in column 1, line 13 of exhibit 209?

A. That is correct.

Q. Does that same explanation apply to each of the other amounts shown in column 16 as the basic wages for the engine crew?

[fol. 3029] A. That is correct.

Q. You say "Train engine." What do you mean by "train engine?"

A. Well, the distance between Tucson and Lordsburg from station to station is 164 miles.

Q. And the train engine, I take it——

A. —is the main engine.

Q. Which handles the train?

A. Which handles the train.

Q. Over the entire district?

A. Or an engine which is double-heading the entire distance.

Q. Now, how do you arrive at the amount shown, the first amount, for example, shown in column 19 under the redispatch, the amount of $15.99?

A. That represents the amount of money for compensation allowed an engineer and a fireman.

Mr. Strouss: I want to make one little objection here. We are, of course, reading into the record now parts of this exhibit, which is only an exhibit for identification and not admitted in evidence.

The Court: Yes, the objection on that ground is perfectly good.

Mr. Mason: I simply used the figure "$15.99" without associating it with anything in particular.

[fol. 3030] Mr. Strouss: I have no objection to using it to identify it, but I don't want you to put it in to show what the exhibit shows.

The Court: I will sustain the objection on that ground as to any concrete figures that may be used.

Mr. Mason: We will go to another amount in the same column. I only want to make the explanation and not to establish these figures of record until the exhibit is offered.

Q. Take the second amount shown in column 19. How did you obtain that?

A. That is obtained by getting the rate applicable to a 5000-class engine in helper service.

Q. The rate for a 5000-class locomotive in service, as indicated by line 1, column H, of exhibit No. 209 is $15.99?

A. That will also apply to column H, did you say?

Q. Yes.

A. An SP-type engine $15.99.

Q. Now, do you use the same multiplier to obtain the figure which is indicated here, this second figure in column 19 in exhibit 198?

A. The same calculation I referred to in arriving at basic rates under column 16.

[fol. 3031] Q. You multiply the rate times miles traveled?

A. That is true.

Q. And if the figure happens to be less than $15.99, it means that the miles traveled were less than a hundred?

A. I will have to go into more detail to explain what those figures are. It is simply the amount of money allowed an engineer and fireman on the face of this sheet,

this exhibit, for the miles that are shown that he helped at the rate and the class of power used.

Q. Now, in obtaining the wages of trainmen, did you use the rate between Tucson and Lordsburg times the miles?

A. That is correct.

Q. For both the actual and the redispatched?

A. That is correct.

The Court: We will take our mid-afternoon recess at this time.

(Thereupon, a short recess was taken, after which, the witness was recalled to the stand, and proceedings were resumed as follows:)

The Court: You may proceed.

Mr. Mason: Mr. Garverick, in making the entries in the lower half of exhibit 198 for identification, did you follow [fol. 3032] the same process for each of the other entries that you have described for the particular entries you have already referred to?

A. Yes, I did.

Q. And referring to the other white work sheets A, it has been testified here that there were altogether 943; and somewhat less, or 848, that related entirely to freight train operation. Did you follow the same methods on each of the other white work sheets, using the same sources as you have described in connection with Exhibit 198 for identification?

A. I did.

Q. Did you check the computations in so far as they applied to the redispatch portion of the sheet?

A. Yes, I did.

Q. When you had finished your work on the white work sheets A, did you turn them over to Mr. Sines?

A. Yes, I did.

Q. Will you say whether or not the entries in so far as they were made by you on the white work sheets A, and particularly on Exhibit 198 for identification are true and correct?

A. To the best of my ability.

[fol. 3033] Q. In column 17 and again in column 24 on exhibit 198 for identification, under the actual, you show

certain amounts as variable amounts. Did you make those entries yourself?

A. I did.

Q. Now, what is represented by these variable amounts. By the way, are those also taken from the time returns and delay reports?

A. They were.

Q. What do they represent?

A. They represent initial or terminal delay, switching, overtime, roundhouse miles to and from the roundhouse, held-away-from-home terminal time.

Q. These are amounts not directly associated with the operation of the train from the starting point to the finishing point other than, of course, the overtime?

A. That is correct.

Q. Was it necessary to make any calculations or simply to copy from the time returns and delay reports?

A. Simply copy.

Mr. Mason: That is all. Thank you, Mr. Garverick. Do you wish to cross-examine him?

Mr. Strouss: No cross-examination.

The Court: Step aside. Call your next witness.

[fol. 3034] Mr. Mason: Your Honor, at this time, the foundation having now been laid, we offer defendant's Exhibit 198 in evidence as typical of the white work sheets A, which have already been tendered to and delivered to Mr. Strouss for his examination and use.

Mr. Strouss: We renew the objection heretofore made to this exhibit.

The Court: Do either of you care to be heard on it? I am not asking for any lengthy argument; I prefer to hear from Mr. Strouss. When the matter was originally presented here, of course, it wasn't actually tendered in evidence, it was marked for identification. We had some discussion about it. Now, after two days there has been considerable evidence introduced explaining and clarifying the exhibit. It seems to me we have come down now to the basic question as to whether a redispatching study and the result thereof is admissible. The upper portion of it, of course, is actual operations. I take it, you have no objection to that.

Mr. Strouss: No, except, of course, the upper part doesn't contain all of the information which we feel should be on there. I mean the matter stated there, we don't question [fol. 3035] that that is correct tabulation of those matters from the train sheet, but using that and I suppose putting on the same sheet for the purpose of comparison a redispatch, which, of course, must be the opinion of the persons who redispatched the trains as to what would have been done, and certain facts which, certainly from the evidence as we see it, would be necessary for the redispatching of that train are not in here. Part of the facts are stated, but not all of them, tonnage for one thing is not shown on here. It is a matter which, as the dispatchers have stated, is necessary to be considered in redispatching trains. Now, we are assuming that the tonnage in these redispatched trains are tonnages which those trains with the power here shown would carry over that territory. The facts are not in there to support that, it is assuming that there are facts without putting the evidence in there to show them. I don't think the foundation has yet been laid for the admissibility of the exhibit.

Mr. Mason: The objection now made appears to be a criticism of its value rather than as to its admissibility. First of all, as to the objection to the actual, of course, the underlying train sheets which are the original records— [fol. 3036] The Court: To save time on it, Mr. Mason, the Court's mind is pretty well made up. It seems to me now that the basic testimony from the dispatchers who participated, together with the evidence of the last witness, the items of pay, that the exhibit is now admissible in evidence. I think your statement is true that probably some of these objections go to the weight of it rather than to its admissibility. As to just how valuable a redispatching study will be to the Court, of course, that is difficult to say at this time. Evidently, a lot of time and effort have been put into it, and there have been brought to the Court the basic underlying sheets, the data which constituted this study, and for what it is worth, I am going to admit the exhibit. The objection is overruled.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 198.")

(Discussion between counsel off the record.)

Mr. Mason: The record may show that Mr. Herrell and Mr. Cassady are excused pending recall.

Mr. Strouss: Yes.

W. P. Herbert resumed the witness stand for

Cross-examination.

[fol. 3037] Mr. Strouss: Mr. Herbert, I think in your direct testimony you testified in preparing your exhibits 177, 178, 179, 180, and 181 you used the unit of cost per gross ton-mile rather than train-mile because a train-mile is an inconstant unit, is that correct?

A. Yes, a train-mile as a unit is variable.

Q. It has factors, in other words, such as the character of the mile, that is one of the reasons that it is variable?

A. No, it is more the fact that the train in one instance might have one car and the next instance have 160 cars and which thereby renders it unfit as a unit of measure.

Q. Of course the gross ton-mile does vary according to the difference in the character of the mile?

A. The gross-ton-mile will be a gross ton-mile regardless of what kind of a mile it might be operated over.

Q. But its cost will vary according to the difference in the character of the mile?

A. Yes, its cost is something else. As to the cost per gross ton-mile or per thousand gross ton-miles, as my exhibits show, the cost on a thousand gross ton-miles is flex-[fol. 3038] ible, whereas the cost per train-mile is not flexible.

Q. The cost would vary according to the character of the loads?

A. Yes, per gross ton-mile, yes.

Q. Whether your cars were loaded to capacity or not. I mean if you have a car loaded at full capacity and one at 50 per cent capacity that would affect the cost per gross ton-mile?

A. I don't see just how you mean it will affect the cost per gross ton-mile.

Q. I was asking whether it would or not.

A. Yes, I believe it will to some extent because the more load, the more trailing load as we sometimes call it, be-

hind the locomotive and tender the less cost per thousand gross ton-miles we will obtain.

Q. The factors which enter into the cost per gross ton-mile, I believe you testified, are fuel, enginemen's wages, trainmen's wages, engine house, and other locomotive supplies, train supplies and expenses?

A. Yes, sir.

Q. Those are the six items which are considered in that cost?

A. Yes, sir.

Q. You take the total of the six items for all freight [fol. 3039] operations and divide by the total gross ton-miles?

A. Yes, sir, the total gross ton-miles excluding the weight of the locomotive.

Q. Of course, fuel being an item of that cost it means fuel for all freight operations, doesn't it?

A. All freight train operations, yes.

Q. Loads and empties?

A. Yes.

Q. So that the number of empties would enter into that to some extent and affect the cost?

A. Yes, it would.

Q. The amount of locomotive-miles required and used in helper service, that would affect the cost?

A. In this exhibit it would have a little effect in the cost of fuel oil.

Q. What about enginemen's wages?

A. Yes, it would have an effect there, too.

Q. Whenever a locomotive is used in helper service, it is only considered a helper when it is cut into the train and helping, isn't that correct?

A. The cost of helper service is the entire cost.

Q. I mean so far as locomotive-miles are concerned, locomotive-miles in helper service are the miles when it is [fol. 3040] actually cut into the train helping and when it is cut out and returns to a station it is running light, those are locomotive-miles light, isn't that right?

A. Yes, they are light miles, but this exhibit deals with gross ton-miles and the freight train cost.

Q. I understood you to say on one exhibit you had added in the last four years the locomotive ligh' because they were included in previous years?

A. They were included on all the years but they had been excluded on the 521's in that computation showing gross tons per train-mile.

Q. That is what I meant; they were included in previous years on the 521's but for these four years had been excluded?

A. Yes, but I included them on my exhibit No. 179.

Q. Then wouldn't a helper engine returning to its station after it is cut out of a train, the locomotive-miles would be classed as light?

A. Yes.

Q. That cost would also be a cost that would enter into this?

A. Yes.

Q. Road switching costs. Road switching as distin- [fol. 3041] guished from yard switching is when the train crew itself does the switching, is that correct?

A. Yes, that is correct.

Q. Road switching would be an item that would enter into those costs?

A. Yes.

Q. And the crew and engine fuel, engine supplies, that might enter into it and would be included there?

A. Yes, they would.

Q. What about volume or density of traffic?

A. In what way?

Q. I mean if the traffic is not available so that your locomotive is not loaded to capacity, that would have some effect upon costs?

A. You mean in ordinary territories or territories restricted to 70 cars?

Q. In territory where the cause of your engine not being loaded to capacity is the lack of traffic?

A. Yes, if the cause is the lack of traffic then that lack of traffic would have some effect.

Q. And, of course, efficiency of the locomotive itself?

A. Yes.

Q. Some locomotives might be more efficient than others [fol. 3042] and use less fuel?

A. Yes, there are various things that affect costs such as that.

Q. And the ratio of branch line to main line?

A. Yes, branch line has its effect or a slight effect. In this particular exhibit it has a very slight effect.

Q. Do you have your 521's here?

A. In the courtroom?

Q. Yes.

A. No, I do not. I am sorry.

Mr. Strouss: I didn't think when I said I could cross-examine Mr. Herbert that I didn't need those.

Mr. Sines: Which ones do you want? I can get them in five minutes.

Mr. Strouss: I want them for the two divisions for the year 1937.

Q. With reference to this density of traffic, there are two main lines, one of which carries heavy traffic and the other light. Of course, the line that carries the light volume of traffic would affect the cost on the other main line where they are both considered together?

A. They were both considered together, on the Tucson division I suppose you are talking about.

[fol. 3043] Q. I am speaking about the Phoenix line and the Maricopa line. It is a fact that on the Phoenix line you don't operate your through freight trains on the Phoenix line, do you?

A. There are through freight trains operated through there, yes.

Q. I mean as a usual practice, the greater percentage of your through freight trains go through Maricopa?

A. That is right.

Q. And your freight trains which are operated on the Phoenix line are mostly what you might call "gathering trains"?

A. Yes, there is more gathering service on the Phoenix line than on the freight main.

Q. In a great many ways it is operated much like a branch line, I mean freight service not passenger service?

A. It has less traffic, I will say, than our freight main; but it is equipped for through freight service and there is through freight service operated on that line.

Q. But your trains which are operated there are lighter and shorter trains?

A. That is right.

Q. And that would have its effect upon the cost, upon [fol. 3044] the operation as a whole on the Tucson division?

A. Yes, it would.

Q. Mr. Herbert, referring to form 521 for the year 1937, the total helper service, main and branch, on the Salt Lake division, locomotive-miles, was 107,757 locomotive-miles, is that correct?

A. That is correct.

Q. On the Tucson division that item was 207,574 locomotive-miles, is that correct?

A. Yes, that is correct.

Q. The car-miles, main and branch loads, Salt Lake, 118,691,150?

A. That is correct.

Q. Empties, 67,847,451?

A. Yes, sir.

Q. That is car-miles, a total of 186,538,601?

A. Yes.

Q. And on the Tucson division, loads, 85,648,095?

A. Yes.

Q. Empties, 53,000,379?

A. Yes.

Q. Total loads and empties, 138,648,474?

A. That is right.

[fol. 3045] Q. Road switching, freight, total Salt Lake, main and branch, 102,648 locomotive-miles?

A. That is right.

Q. Tucson, 118,494?

A. That is right.

Q. Do you have the year 1938, Salt Lake helper locomotive-miles, 86,656?

A. 83,656.

Q. Tucson, 192,867?

A. No, that is for last year. 208,892.

Q. The car-miles, loads and empties, loads 101,080,199, Salt Lake?

A. That is right.

Q. Empties, 59,555,854?

A. That is right.

Q. Total, 160,636,053?

A. That is right.

Q. Tucson, 77,183,015?

A. That, again, is last year's, 83,598,395.

Q. What is the empties?

A. 55,914,520.

Q. And the total?

A. Loaded and empty, 139,569,915.

Q. Road switching?

A. I guess I am in error. I have the wrong year for [fol. 3046] Tucson. You gave the right figures for those.

Q. Will you call those again; Tucson division, loads?

A. 77,183,015.

Q. Empties, 50,201,472?

A. That is right.

Q. Total, 127,384,487?

A. That is right, and on the helper miles it would be 192,867.

Q. Road switching, Salt Lake division, for 1938, 69,288 locomotive-miles?

A. Yes, that is right.

Q. Tucson, 108,666?

A. That is right.

Q. 1939, helper, Salt Lake, 99,479 locomotive-miles?

A. That is right.

Q. Tucson, 208,892?

A. That is right.

Q. Car-miles, loads, Salt Lake, 115,547,105?

A. That is right.

Q. Empties, 67,087,547?

A. That is right.

Q. Total, 182,634,652?

A. That is right.

Q. Tucson, loads, 83,598,395?

[fol. 3047] A. That is right.

Q. Empties, 55,911,520?

A. That is right.

Q. Total, 139,509,915?

A. That is right.

Q. Road switching, Salt Lake, 65,298 locomotive-miles?

A. That is right.

Q. Tucson, 121,902 locomotive-miles?

A. That is right.

Q. Now availability of materials and supplies, of course that would affect costs to some extent?

A. Availability of supplies?

Q. For example, your water costs for locomotives differ on the two divisions?

A. Yes, they will differ slightly.

Q. That will affect your costs?

A. It does not affect this cost as shown on these exhibits however, as that particular account is not included in these direct costs as shown on the 521.

Q. It is not a locomotive supply?

A. It is, but it is not one of the selected costs as selected on this 521.

Q. It is not one of the costs selected as a train cost, is that what you mean, in the form 521?

[fol. 3048] A. No, sir.

Q. It is a train cost, however?

A. Yes, sir, it is.

Q. I notice on exhibit No. 177, taking the year 1937 for example, you have on the Tucson division cost, September and October, the cars per train as identical but your costs varied approximately three cents?

A. Yes, that is true.

Q. So that costs would vary even though your train lengths didn't vary?

A. There are, as I stated before, various factors that affect costs but here I was attempting and I believe I did show the trend lines of cost rather than trying to depict any particular variation from one month to another.

Q. On referring to these exhibits, 177, 178, and 179, you have stated car loadings would affect the cost?

A. Yes.

Q. And if my calculation is correct, Mr. Masson's exhibits 163 and 164, the tons per car on the Tucson division for the year 1939 was 12.4 tons, Salt Lake, 13.8 tons; 1938 on the Tucson division, 12.28, and on the Salt Lake, 13.48, which would show there was at least a ton more per car [fol. 3049] being loaded on the Salt Lake division than on the Tucson division, isn't that true?

A. If that calculation is correct, that would be true.

Q. I wouldn't guarantee my calculations but I am using to get that figure, line 3 of exhibit No. 163, which shows on the Tucson division, 1939, average freight cars per train, 56.7, and net tons per freight train, 702. If line 3 were divided into line 4, that would give the tons per car, wouldn't it?

The Court: Mr. Reporter, when the witness finds the exhibit, will you read back Mr. Strouss' question, please?

(The last question was read by the reporter.)

The Witness: What year, may I ask?

Mr. Strouss: I was using the year 1939.

The Court: The principle, of course, would be the same in every year.

Mr. Strouss: Yes.

The Witness: Yes.

Mr. Strouss:

Q. And the same would be true, dividing line 3 into line 4 on exhibit No. 164 would give you the net tons per car on the Salt Lake division in each of those years?

A. Yes, sir.

[fol. 3050] Mr. Mason: That is assuming that these are freight cars per freight train, exclusive of caboose here.

Mr. Strouss: It is your exhibit.

Mr. Mason: I know, and the record should show whether they are inclusive or exclusive of caboose. The record doesn't show.

The Court: Well, we won't quibble over the caboose at this hour.

Mr. Strouss: Now, exhibit No. 181 is main line only?

A. Yes.

Q. But main line on the Tucson division of course does include the Phoenix line?

A. Yes, it does.

Q. And would be affected by the lighter volume of traffic and shorter trains on that division or on that branch?

A. It would be influenced by the traffic on that line.

Q. Now, this exhibit No. 200, grade crossings in Arizona, and exhibit No. 201, grade crossings in Nevada, you don't have those in such form as to show the location of the crossings with relation to the line itself?

A. No, I do not.

[fol. 3051] Q. Were you a witness in the Nevada case?

A. No, I was not.

Mr. Strouss: It is my recollection that is was presented that way there. I think that is all.

The Court: Any further redirect?

Mr. Mason: Well, I am not certain. In view of the lateness of the hour, I would like to reserve the privilege of recalling the witness.

The Court: The court will stand at recess until January 28th at ten A.M.

(Thereupon the court stood at recess until January 28th, 1941, at ten o'clock A.M.)

[fol. 3052] January 28, 1941, ten o'clock A. M.

All parties being represented as heretofore noted, proceedings were resumed at this time as follows:

W. W. Judson was recalled to the stand, and testified further as follows:

Cross-examination.

By Mr. Strouss:

Q. Mr. Judson, on your Exhibit 207, I notice that there are points, Livingston to Logan, and then Livingston to Bozeman, Livingston to Bozeman is an intermediate point between Livingston and Logan?

A. Yes, sir.

Q. There has not been any duplication, that is, trains haven't been counted twice by reason of using intermediate terminals there?

A. Well, I don't see the Livingston to Bozeman one that you mention.

Q. Bozeman to Logan.

A. No, there is no duplication in there.

Q. Now, I notice in your average consist that your loads are mostly other than perishables. What commodities [fol. 3053] made up those loads mostly there, do you know?

A. You meant other than perishables?

Q. Other than perishables. It would be under column B of average consist.

A. Well, I wouldn't know what these particular loads were.

Q. At that time of the year, is there any particular commodity which you carry on your lines?

A. Well, there would be some wheat moving at that time of year, lumber.

Q. Coal?

A. Coal.

Q. Would you take coal over these two districts that you have used here?

A. Yes, sir, company coal, principally company coal.

Q. What about ore, would there be any ore moving at that time over those districts?

A. As far as Missoula to Helena, very little east of Helena and Butte because the ore out of the Wallace district moves into Helena and Butte, which would show on this exhibit as far as Helena.

Q. How many through trains do you have scheduled over this territory?

A. One in each direction. That is, scheduled.

Q. Yes. You refer in your testimony to alternate line [fol. 3054] operations, page 2997, what do you mean by that term, Mr. Judson?

A. I can explain that on the map, I believe. Between Bozeman and Logan there are two lines of railway. One is used as a passenger line and a westward freight line, and the other is used as an eastward freight line, Logan to Bozeman. They are separate lines of railway.

Q. And the term of "alternate line operations," just refers to that district?

A. Well, there are others. Between Logan and Garrison are alternate lines, one via Helena and one by Butte, but the Butte line doesn't enter into the exhibit, because it is not the through freight line. Through freight operates by way of Helena.

Q. Will you just refer to the exhibit and tell me which of the districts shown in columns A and B are double track. Dickinson to Glendive?

A. Single track.

Q. Livingston to Logan?

A. Double track from Livingston to Butte and alternate line from Butte to Logan, I mean Livingston to Bozeman double track, and alternate line Bozeman to Logan.

Q. Now, Logan to Helena?

[fol. 3055] A. Single track.

Q. Helena to Missoula?

A. It is double track out of Helena for about twelve miles, then single track to Garrison and double track Garrison to Missoula, which is about 68 miles.

Q. It is double track, Garrison to Missoula?

A. Yes.

Q. Now, in operating your trains, do you operate as much as you can so as to use your double track for passing?

A. Well, I don't know as I understand your question.

Q. Well, to try to get your trains so that when they pass, they are passing on double track, I mean meeting and passing on double track rather than on single track.

A. Well, it very often happens that they meet on double track and we do call trains at the terminals, so that that can be done if it is convenient, but it is not an iron-clad rule of any kind.

Q. Your double-tracking was not spaced with that idea in mind?

A. The double-tracking in this particular territory, you will notice, from Missoula to Garrison is double-tracked and Garrison is the junction of the two lines. That gives us. [fol. 3056] a double track up to the junction point and then on the other end of the alternate line at Logan it is double-tracked and has an alternate line into Livingston and that permits of a free flow of traffic via either line with double tracks on each end.

Mr. Strouss. That is all.

Mr. Mason: No further questions.

The Court: May this witness with his records be excused?

Mr. Strouss: Yes.

The Court: It is so ordered.

Mr. Mason: Do you have some further cross-examination of Mr. Herbert?

Mr. Strouss: Yes, I have some other questions.

[fol. 3057] W. P. Herbert was recalled as a witness for further

Cross-examination.

By Mr. Strouss:

Q. Mr. Herbert, on your exhibits Nos. 178 and 180 I notice that there appears to have been a dip downward in cars per train, gross ton-miles per train, and car-miles per mile of road in the years 1925, 1926, and 1927. That

was the period immediately following the acquisition of the Arizona Eastern, was it not?

A. Yes, it was.

Q. When the operation over the so-called "Phoenix line" began?

A. Yes, that is true.

Q. Wouldn't the amount of bridge traffic have some effect on costs?

A. What way do you mean bridge traffic?

Q. If the percentage of bridge traffic on one division were greater than as compared with another division, wouldn't that have some effect upon the costs? Can't bridge traffic be handled at a lesser cost than traffic which is picked up on the division so far as division costs are concerned?

A. Ordinarily I would say "Yes."

[fol. 3058] The Court: Mr. Strouss, what do you mean by "bridge traffic"?

The Witness: Bridge traffic is traffic that originates on another division and is bridged over, for instance, the Tucson or Salt Lake division, and then terminates on some other division.

The Court: Non-revenue company traffic?

Mr. Strouss: No, it is revenue traffic. Isn't that correct, revenue traffic which originates on another division and simply passes over that particular division as a bridge to carry through?

A. Yes, that would be more economically handled than traffic originating on the division.

Mr. Mason: I think we should understand the term, "bridge traffic," as having nothing to do with the revenue or non-revenue characteristics. The term, "bridge traffic," simply applies to traffic which originates outside the territory considered and is delivered outside the territory considered.

Mr. Strouss: That is true.

The Court: I wanted to be certain I got the meaning of your term.

Mr. Strouss:

Q. The Court asked you concerning double tracking in Arizona and Nevada. The only double tracking in Arizona

[fol. 3059] is a few miles between Yuma and Wellton and then some just out of Tucson?

A. Tucson to Mescal.

Q. Those two places are the only double tracking in Arizona?

A. The only two that are strictly termed double track. However, we have two lines in Arizona, as you can see by the map, exhibit No. 1.

Q. As I understood the testimony, however, your through freight, very little of it is carried over the Phoenix line?

A. That is right.

Q. In Nevada there is double tracking from the state line to Sparks?

A. Yes.

Q. And from Perth to Rose Creek?

A. Yes, I believe that is correct.

Q. Then you have the paired track operations from Weso to Alazon?

A. Yes.

Q. The operation there is similar to a double-track operation, isn't it?

A. Yes.

Q. Then you have what additional double tracking in Nevada?

A. We have double tracking from Cobre to Teconna and [fol. 3060] some across the Great Salt Lake, it doesn't show on this exhibit the exact stations.

Mr. Mason: I think the Great Salt Lake is all in Utah.

A. That is right. There is a small part east of Wells, possibly about ten miles.

Mr. Strouss:

Q. In your testimony you testified and in your charts you show the trend of costs on the two divisions, costs as shown including both main-line and branch-line operation?

A. Yes.

Q. From your form 522 which prior to 1931 showed or segregated both main-line and branch-line costs, I have taken the main-line costs, on the two divisions which I would like to read to you and ask you to check them to see if these are correct. I think you can check them afterwards, it may take a little time.

A. All right.

Q. Salt Lake, main line, .877.

Mr. Mason: What year is this?

Mr. Strouss: 1920.

Mr. Mason: What is the cost? Per what?

Mr. Strouss: It would be 8.77 for that year per hundred gross ton-miles; 1921, per thousand gross ton-miles, still [fol. 3061] Salt Lake, .814; 1922, .735; 1923, .606; 1924, .596; 1925, .48; 1926, .38; 1927, .37; 1928, .359; 1929, .384. Tucson division, 1920, per hundred gross ton-miles, 9.90; 1921, shown at per thousand gross ton-miles, .90; 1922, 746; 1923, .661; 1924, .676; 1925, .582; 1926, .50; 1927, .454; 1928, .468; 1929, .466. That is all the questions I have.

[fol. 3062] Redirect examination.

By Mr. Mason:

Q. Mr. Herbert, you were asked to confirm for the record certain statistics of helper locomotive miles for the Tucson and Salt Lake Divisions for the years 1937, 1938, and 1939. Now, I will ask you if by reference to the Forms 521 for the two divisions for the two years you have computed the percentage ratio of the helper-miles on each division to the total locomotive-miles on each division for each of those years?

A. Yes, I have.

Q. And will you state for 1937 the ratio of helper-miles to total locomotive-miles for the Tucson division?

A. For the Tucson division, 6.6 per cent.

Q. For 1938?

A. 7.1 per cent.

Q. For 1939?

A. 6.9 per cent.

Q. Now, for the Salt Lake Division for 1937, what is the ratio of helper-miles to total locomotive miles?

A. 3.6 per cent.

Q. For 1938?

A. 3.5 per cent.

[fol. 3063] Q. For 1939?

A. 3.7 per cent.

Q. You were also asked, in this connection, to verify the road-switching-miles of freight service performed on the two divisions. Have you computed the ratio of road-

switching-miles to total miles for locomotives for the two years?

A. Yes, sir.

Q. What is the figure for the Tucson division for 1937?

A. 3.6 per cent.

Q. For 1938?

A. 3.9 per cent.

Q. For 1939?

A. 3.9 per cent.

Q. What are the corresponding figures for the Salt Lake Division for those three years?

A. 1937, 3.3 per cent; 1938, 2.8 per cent; 1939, 2.4 per cent.

Q. Those represent the ratio of the road-switching-miles to the total of locomotive-miles reported on 521?

A. Yes, but, I might add, in order to get the total averages computation, I added the road-switching-locomotive-miles to the total.

Q. So that the total which you have used as a basis for [fol. 3064] the ratio represents the locomotive-miles in freight service plus the road-switching-miles.

A. Yes, sir.

Q. And the total locomotive-miles themselves are applied as the divisor in obtaining that ratio?

A. Yes, sir.

Q. Now, it was also suggested in your cross-examination that the availability of traffic or its non-availability, rather, and the presumed consequent effect upon locomotive loading would have some effect on cost. I will ask you if the total of the car-miles made on a division as reported after they are made on the Form 521 in any way indicates the amount of traffic on hand to be moved?

A. No, it doesn't.

Q. What does it indicate as to the amount of traffic?

A. It indicates in a general way the amount of business moved.

Q. Does it indicate the amount that was moved?

A. The amount of cars that were moved, it would indicate that in some way, but it doesn't indicate, for instance, the amount of cars that could be moved in any one train. [fol. 3065] Q. Does the total of car-miles, as shown on 521, in any way reflect the train lengths?

A. No, it doesn't.

Q. Now, again, it was suggested in your cross-examination,——

The Witness: (Interrupting) I might make something else clear there, that even though Arizona might have fewer car-miles than Nevada, it is the aggregate over a year, it doesn't necessarily show or say that we could not, if the law were unrestricted, handle the same number of cars per train as handled in Nevada.

Q. It doesn't indicate one way or the other as to that?

A. No, it doesn't.

Q. As a matter of fact, the showing of car-miles on 521 is a history of past performance and not a showing of prospects, is that right?

A. That is correct.

Q. It was suggested in your cross-examination that the loads per car as between loading to capacity and loading at half capacity might have some effect on the gross ton-mile cost. I will ask you if the car loadings can have any effect on the cost per gross ton-mile for moving the [fol. 3066] car, or whether that effect would be solely on the cost per net ton-mile?

A. It would be practically all on the net ton-mile costs, except to a slight extent in Arizona, because of the restriction in train lengths.

Q. You were asked to verify certain figures as to total car-miles and empty car-miles for each year on the two divisions. By each year, I mean each of the three years 1937, 1938, and 1939. I will ask you if you have computed for each division for each of those years the ratio of the empty car-miles to the total car-miles made?

A. Yes, sir, I have.

Q. What is the ratio of empty car-miles to total car-miles made on the Tucson division for 1937?

A. 38.2.

Q. In per cent?

A. Per cent.

Q. And for 1938?

A. 39.4 per cent.

Q. 1939?

A. 40.1 per cent.

Q. Now, for the Salt Lake Division for 1937, what was the ratio?

A. 36.4 per cent.

[fol. 3067] Q. For the year 1938?

A. 37.1 per cent.

Q. And for 1939?

A. 36.7 per cent.

Q. It was suggested during the course of your cross-examination, pages 3036 to 3050, that the lighter density of traffic on the Phoenix Main Line might have some influence upon the unit cost upon the Tucson Division. Now, I will ask you if there is on the Salt Lake Division, and as part of that Salt Lake Division, a line classed as main line which is likewise of lighter traffic density than the principal main line?

A. Yes, the line from Alturas to Fernley is a line of light density traffic.

Q. What is the length of the line from Alturas to Fernley?

A. Approximately 180 miles on the Salt Lake Division.

Q. That line is all a part of the Salt Lake Division from Alturas to Fernley?

A. Yes.

Q. And since 1929 has entered into the cost, main line costs, for the Salt Lake Division?

A. That is right.

Q. I think it was suggested in your testimony, though [fol. 3068] I haven't the precise transcript reference, that the cost of water for train locomotives was not included in the costs entering into the computations on your exhibit 177 and following. I recall some testimony on that point. Will you say whether the cost for water for train locomotives is or isn't included in the figures leading to the cost of per thousand gross-ton-miles as shown on your exhibit?

A. Yes, I made a check on that, and I find it is included in the 521.

Q. What general subdivision and in what particular accounts?

A. The accounting department has grouped three accounts there included in "Other Locomotive Supplies," 397, water for train locomotive, 398, lubricants for train locomtive, and 399, other supplies for train locomotives.

Q. They are called collectively what?

A. Other Locomotive supplies.

Q. This morning you were asked as to the extent of double track on the Tucson and Salt Lake divisions. Do you know, Mr. Herbert, and if so will you state whether the preponderance of passenger traffic on the Tucson division passes over the Phoenix line or Gila line?

[fol. 3069] A. Over the Phoenix line.

Q. Do you know what the daily separation is as to passenger traffic over the two lines?

A. I believe there is one train in each direction a day over the Gila line.

Q. What does that mean over the Phoenix line?

A. Three regular passenger trains a day on the Phoenix line in each direction.

Q. Or six altogether in both directions?

A. There are four altogether. When I said one in each direction, I meant one train. It might be one train of one number in one direction, and one train of another number in the other direction on the Gila line.

Q. In any event, of the four regularly scheduled passenger trains between Yuma and Tucson, in each direction, three are regularly scheduled over the Phoenix line and one only over the Gila line; is that correct?

A. Yes, except No. 30 and 29, which now operates on every odd day, I believe it is, which is the new Arizona Limited, operates between Tucson and Phoenix in addition to those other regularly scheduled passenger trains mentioned.

Q. That is half a train a day each way, from Tucson to Phoenix?

[fol. 3070] A. Yes, sir.

Q. Then there are each way three-and-a-half trains daily on the Phoenix line, and only one on the Gila line?

A. That is right.

Q. I will ask you whether this separation of the passenger traffic over the Phoenix line, and the freight traffic over the Gila line, except for the Phoenix service, is a help or a hindrance as to the matter of interference as to freight and passenger train operation?

A. It is a help to the main freight line to have the passenger trains out of the way, because there is less interference. Passenger trains having the right-of-way in most cases over freight trains, naturally causes the freight trains to be set aside for them at meets.

Mr. Mason: That is all. I expect to recall Mr. Herbert later for additional testimony that has not yet been developed.

Recross-examination.

By Mr. Strouss:

Q. You say that in calculating the percentage of road switching you added the road switching in each division [fol. 3071] to get the total. Did you do that also in determining the ratio of helper-miles?

A. Well, in helper-miles the total included the helper-miles on the 521, and I didn't have to do that.

Q. In the helper-miles, did you also consider the helper-locomotive, the miles light returning after it had been cut out of the train?

A. No, I just showed the helper-miles as shown on the form 521, and as picked out by you in my cross-examination.

Q. Now, you referred to the Alturas-Fernley main line. Of course, the effect of the main line having trains of lighter traffic would have upon the balance of the main line would vary according to the amount of traffic there might be on a particular light traffic section, wouldn't it?

A. Yes; it is merely pointed out here to show that Salt Lake division does have a main line with light traffic on it.

Q. It is true that the traffic on the Phoenix line is of considerably greater density than that on the Fernley-Alturas line?

A. I couldn't say as to that off-hand, whether it would be considerably or not.

Mr. Strouss: That is all.

(Witness excused.)

[fol. 3072] Walter Bohnstengel was called as a witness on behalf of the defendant and, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mason:

Q. State your name and residence.

A. Walter Bohnstengel, Topeka, Kansas.

Q. Are you employed by a railroad company?

A. I am.

Q. Which company?

A. The Atcheson, Topeka and Santa Fe Railway.

Q. In what capacity?

A. As engineer of tests.

Q. How long have you been employed by the Santa Fe?

A. The first in 1906-1907, at Dodge City, in the roundhouse, and since January 1, 1912, in the test department at Topeka, Kansas.

Q. Your experience, then, is 28 years continuous, plus some prior experience?

A. Isn't that 29 years?

Q. 29 years, that is correct. Is that right, 29 years continuous?

A. Yes, sir.

Q. Do you hold any engineering or scientific degrees, [fol. 3073] Mr. Bohnstengel?

A. I do.

Q. Will you state what they are?

A. Bachelor of science in mechanical engineering, University of Kansas, 1910, and mechanical engineer from the University of Kansas, 1920.

Q. You have been engineer of tests for how long?

A. Since July first, 1940.

Q. And prior to July 1, 1940, what was your position with the Santa Fe.

A. Beginning January, 1912, I was test department assistant, later laboratory foreman and assistant to engineer of tests, then assistant engineer of tests from about 1917 or 1918, and engineer of tests; on promotion of Mr. Chapman, the then engineer of tests, to Chicago, I was appointed engineer of tests at Topeka.

Q. Have you assisted or supervised tests of railroad equipment during your employment by the Santa Fe?

A. I have, sir.

Q. For how long?

A. Most of the time that I have been in the test department, I have done individual work to a good extent, but [fol. 3074] also supervised the work of others in that line.

Q. Do you belong to any technical associations or societies having to do with your work as engineer of tests?

A. I do.

Q. Will you name some of these societies to which you belong?

A. I belong to the American Society of Mechanical Engineers as a member, American Society for Testing Materials, the American Railway Engineering Association, and the Association of American Railroads.

Q. Any particular section of the latter?

A. The mechanical section of the latter.

Q. Will you list some of the types of railroad equipment or material which you have tested or assisted in testing?

A. It has to do with materials such as—my earliest work in the test department was in connection with steel, rails, ties, ballast, then car and locomotive equipment, operation and functioning of ventilators and ventilating cars, locomotive tests about 1914 between Chicago and Chillicothe, and later Chillicothe to Shopton, Iowa.

Q. Have you tested such parts of equipment as wheels?

[fol. 3075] A. I have, yes, sir.

Q. Tires?

A. Yes, sir.

Q. Axles?

A. Yes, sir.

Q. And fixed material such as bridge timbers?

A. Yes, sir.

Q. Track material?

A. Yes, sir.

Q. Ties?

A. Ties, joint bars or angle bars as they are called, track bolts, rails.

Q. Have you ever ridden on railroad trains or cars for the purposes of these tests?

A. Not particularly the material tests, but the check of riding and equipment such as locomotives, cars, and action of these in service.

[fol. 3076] Q. Have you ridden on locomotives for the purpose of testing equipment?

A. Yes, sir.

Q. Can you state the approximate number of miles that you have ridden for the purpose of tests or verification of tests?

A. For tests including going to and from work, checking riding equipment with and without instruments, say from 35 to 75 thousand miles a year. I think 75 is the high. Last year in line of duty it was a little under 50,000.

Q. Have you made any tests of locomotives in actual service in the handling of trains?

A. Yes, sir, particularly power performance and tonnage performance.

Q. Have you ever ridden on freight trains for the purpose of making tests of equipment other than locomotives?

A. Yes, sir, in connection with riding qualities of locomotives and cars, snubbers and spring action, and the longitudinal action, such as occurs in connections between equipment cars, as draft gears, etc.

Q. Have you ridden on freight trains of various lengths for this purpose?

A. Yes, sir.

[fol. 3077] Q. What lengths?

A. Possibly from fifty to one hundred cars or over.

Q. On what railroad lines were those trains being operated?

A. Mostly Santa Fe.

Q. Have you ridden on trains on other railroads as well?

A. For that purpose, no, but in connection with tonnage tests on the Frisco when I was accompanying our dynamometer car about 1917 or 1918, December of 1917 and January of 1918 as I recall.

Q. Have you ridden over the Santa Fe pretty generally in making your test observations?

A. Yes, particularly the main lines.

Q. What part of the freight trains have you ridden, that is, the head or rear of where?

A. The last freight train I was on was a 106-car train from Emporia to Argentine. That was on September 23rd, as I recall it, because I had a little difficulty getting on.

Q. 1940?

A. Yes.

Q. On what part of the train did you ride?

A. I rode in the business car just ahead of the way car which was on there on account of the 11-car fruit shipment [fol. 3078] from California to Chicago and I was checking the riding action.

Q. When you speak of the way car, do you mean the car usually called the caboose?

A. The way car or caboose as we term it.

Q. Have you ridden generally at the rear end or near the rear end of freight trains?

A. I have on occasions where I wished to observe the action.

Q. What is your purpose in riding at the rear end of these freight trains?

A. Just to observe the performance and action where train handling was involved.

Q. In the course of the testimony here, reference has been made from time to time to a particular appliance or device attached to freight cars known as the draft gear. Are you familiar with that portion of the freight car?

A. I am.

Q. Have you ever made studies or tests relating to draft gears?

A. Yes, sir, rather extensive tests.

Q. Will you please state in general what is the purpose and function of the draft gear?

A. The draft gear at the tender of a locomotive and at both ends of cars is placed there with the idea of providing [fol. 3079] a flexible cushioning connection between the various units of your train to protect against shocks and make a yielding energy-controlled unit between the cars of the train.

Q. Is the draft gear connected to the coupler?

A. Yes, sir.

Q. Does the draft gear serve any purpose in absorbing shocks?

A. It does.

Q. Does it serve any purpose in the starting of the trains?

A. It does, in that it provides a flexible means that you don't have to start your entire train at once, you start it in increments.

Q. You start it one car at a time, so to speak?

A. Essentially that, taking slack in your train to start a little at a time and get your whole train rolling, which runs easier after rolling than the initial start.

Q. Are you a member of any committee or committees of railroad employees or officers having to do with the determination or maintenance of standards for draft gears?

A. I am.

Q. Will you state the name of that committee?

A. I am a member of a coupler and draft gear committee [fol. 3080] of the Association of American Railways and also a member of the subcommittee on draft gears of that same association.

Q. What is the nature of your work in that particular connection?

A. The idea is to supervise tests of draft gears for certificates of approval and check draft gears from time to time as one of the functions of the American Railway Association to see that they are maintained according to specifications.

Q. Did you study merely the experimental types of draft gears as invented from time to time or those which are supplied for application to freight cars?

A. The Association through its committee members studies the perfected models of draft gears rather than the experimental.

Q. When you say the Association, you mean that you yourself do that?

A. As a member of the committee and sub-committee.

Q. Then your work is not so much the purpose of development as to test what someone else has developed?

A. To see that it is suitable for the purpose intended.

[fol. 3081] Q. Have you participated in any tests of draft gears?

A. I have, yes, sir.

Q. Do those include laboratory tests?

A. Laboratory and car impact which may be considered laboratory also.

Q. Do they include as well field tests or reviews of performance in actual service?

A. They do to a limited extent.

Q. Will you state just what is done in these laboratory tests, I mean very briefly, what sort of implement you use in testing a draft gear?

A. That is rather a large subject and is a little difficult.

Q. Do you have a method of testing a draft gear in the laboratory by means of a heavy hammer?

A. Two methods are used, one is termed "static loading" under a testing machine where you can apply 400, 600 thousand pounds to close the draft gear. The other is the dynamic test which is under the hammer. We have in the Association laboratory equipment really three hammers, one is a two thousand pound or 2,240 pound hammer which is used on axles and rail; then a 9,000 pound hammer, I am referring to the falling weight, a 9,000 pound hammer that was used up to about 1928 or 1929 for the test of [fol. 3082] draft gears and now the 27,000 pound ham-

mer that has become standard for that same purpose. The reason, I believe, may be evident, the 2,000 pound hammer would have to drop considerably further and strike at a much higher relative velocity than the 9,000, so years ago, before the war, before 1918 a 9,000 pound hammer was used which of course limited the drop to quite an extent and then in order to get down to the mass comparable with the weight of a car the still heavier hammer was decided upon, which was built for use at Purdue University, the American Railway Association laboratories, where it is now serving its purpose to test dynamically draft gears, spring nests, spring snubbers, and equipment that is subject to a shock or quick action. The slow testing machines like the Riehle or Olsen or Emery Tatnall are still used for slow loading to get your curve or performance under a slower load.

Q. When you speak of slow loading machines, is that a means of applying continuous pressure by hydraulic or other means?

A. Hydraulic or screw means.

Q. Rather than the sudden application of pressure such as developed by the drop of the hammer?

[fol. 3083] A. The hammer develops its force by gravity. The tests are started by raising the hammer just in contact with the draft gear and tripping it just letting the weight drop upon the draft gear. Then it is raised half an inch, then an inch, then an inch and a half, small increments to determine the behavior under successively increased dynamic load upon the draft gear.

Q. I take it that the dynamic load, as you speak of it, increases with the height of the drop?

A. It does.

Q. And you can obtain in the same way an increasing slow load by increasing the pressure with the slow loading machine?

A. You can; while they are comparable they are not always identical.

Q. You spoke also of car impact. Is that a particular method of test?

A. That is a method that was developed by the U. S. R. A., United States Railway Administration.

Q. You have participated in such car-impact tests, have you?

A. I have, yes sir.

Q. How is the car-impact test undertaken?

A. The ends of two cars are equipped, the buffing ends are equipped with a draft gear that is desired to be tested. [fol. 3084] One car is stationary, the other car is pulled up an incline of known percentage of grade and tripped at a certain point which will give it a certain impact speed of, say, one mile, one and a half miles, two miles per hour successively higher, the intent of it being to determine at what car impact a draft gear will go solid, close entirely.

Q. Is the car which is hauled up the incline allowed to roll down the incline and strike against the other car?

A. It is allowed to go down the incline to get its speed and then travels on level track so that it is supposed to be at a constant speed and impacts on level track, and a chronograph is used, if I recall my setup rightly, about a 30-inch movement that is rotated at a constant speed from which you can measure the fraction of a second or the number of seconds that it takes for one draft gear to close and for the mate to close and for the two to open. You can from that plot each car as it does its own drawing, it is not done manually, it has to be adjusted of course by operators but it gives you a diagram or picture or how one car slows down and the other car speeds up.

Q. And the reaction of the draft gear to the impact?

[fol. 3085] A. That is the intent of it.

Q. You spoke of the Association of American Railroads' laboratory. Is that at Purdue University?

A. That is at Purdue University.

Q. Have you participated in tests at other laboratories?

A. I have, yes, sir.

Q. Do the manufacturers of draft gears maintain laboratories for the testing of their products?

A. They do.

Q. Have you tested draft gears at the manufacturers' laboratories as well as at Purdue?

A. I have at several different ones.

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

The Court: You may proceed.

Mr. Mason:

Q. Mr. Bohnstengel, you spoke of this laboratory at Purdue as being the Association laboratory. Do I under-

stand that the Association of American Railroads built and equipped that laboratory?

A. They did, yes, sir.

[fol. 3086] Q. Is it open to the use of the university and the university students in the mechanical department there?

A. It is rather a commercial laboratory where manufacturers pay to get their various devices or equipment that needs such tests subjected to official tests. The students can visit there and examine it, but they do not use it for student work.

Q. They use it more for the purpose of observation I take it?

A. If they come at all yes, sir.

Q. I take it that you test other things than draft gears there?

A. It is built primarily as a draft-gear laboratory but they do test spring snubbers and car springs.

Q. What is the purpose of these various tests you have described as employed in connection with draft gears?

A. Should I elaborate a little on that? Go back into the development from 1918?

Q. I intend to ask you about that later. Do you use these tests to determine whether draft gears in commercial service or proposed for commercial service meet certain specifications?

[fol. 3087] A. That is the intent of the tests, to see that they meet the American Railway Association specifications.

Q. Those specifications have to do with the strength and resistance to shock or stress, do they, as well as the size and character of material?

A. Durability and so forth of the equipment.

Q. You spoke of the drop test or the hammer test. Is that comparable to the action of a pile driver hitting on top of a pile?

A. Very much. The pile driver, however, some of them add steam pressure to the gravity action of their hammer while this depends entirely on gravity and is a fixed quantity for any one location.

Q. You spoke of the 27,000-pound hammer as in use there. What drop with a 27,000-pound hammer is the maximum that you use in connection with the present standard types of draft gear?

A. A draft gear to meet specifications must at least withstand 18,000 foot-pounds of energy, which would be the weight, 27,000-pound weight, divided into that many foot-pounds or inch-pounds which, I believe, gives you a figure of approximately six inches.

Q. You spoke of the minimum being 18,000 foot-pounds [fol. 3088] of energy applied at the end of the draft gear?

A. At the end of the draft gear.

Q. What is 18,000 foot-pounds of energy equivalent to in pounds per square inch?

A. Not in pounds per square inch, it would be total load.

Q. Well, total load?

A. Total load on the draft gear would be equivalent from three to five hundred thousand pounds.

Q. You spoke of a car-impact test. Do you use a loaded car for that test?

A. Fully loaded car, 70-ton car as I recall was used in our work; that would be 210,000 pounds on rail.

Q. What type of car would that be?

A. They were gondola cars loaded with iron pigs or pig iron, whichever way you want to word it.

Q. Is the car impact test in any respect similar to the actual movement of cars against each other in switching operations or shunting?

A. It would be very similar to hump-yard switching and comparable to picking cars and letting them couple into each other.

Q. You speak of hump-yard switching. You mean where [fol. 3089] cars are moved to different tracks in the yard by means of gravity?

A. Yes, sir.

Q. We have been discussing the draft gear. I want to ask you if there is any distinction between the draft gear and the appliance sometimes called the "drawbar"?

A. Those two terms are used interchangeably to a certain extent.

Q. Are they properly interchangeable or are they really distinct?

A. That would be difficult to answer.

Q. Will you state what the drawbar is usually thought of as consisting?

A. The drawbar or the draft rigging usually consists of the items, coupler, follower plates, knuckle, yoke, and draft gear.

Q. Then the draft rigging is the proper term for the entire assembly of drawbar and draft gear, is it?

A. I think that is more inclusive than to say the coupler or one of the items.

Q. The coupler and the draft gear are two separate things, aren't they?

A. The coupler and drawbar are used more or less [fol. 3090] interchangeably but never include the draft gear.

Q. What is the draft gear itself as distinguished from the drawbar? Is that merely the mechanism to which the drawbar is attached?

A. It is the flexible mechanism in the draft gear proper.

Q. Have you an exhibit in the form of a series of three drawings which will show the draft gear, drawbar, coupler, and so forth?

A. Yes, sir.

Q. The exhibit is in one sheet with three different drawings on it entitled, "Comparative Position of Couplers under Maximum Draft Gear Travel, Normal Buff and Pull." Have you that drawing before you?

A. Yes, sir.

Q. Was this prepared at your direction?

A. Yes, sir.

Q. Have you reviewed the drawing?

A. I have, yes, sir.

Q. I understand that it represents a particular type of draft gear, according to its title, known as the "National M-17" and "M-17-A" draft gear?

A. It does, yes, sir.

Mr. Mason: May this be marked as defendant's exhibit [fol. 3091] next in order?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 210 for identification.

Mr. Mason:

Q. Are you familiar with National M-17-A and National M-17 draft gear?

A. I am, yes, sir.

Q. Have you seen that draft gear both in actual use as well as represented by model?

A. I have.

Q. Have you made studies of the drawings representing the draft gear?

A. Yes, sir.

Q. And of the draft gear itself?

A. I have.

Q. Have you compared the drawings before you with the draft gear or drawings of that draft gear to determine whether it is correct?

A. It is essentially correct.

Q. Do these drawings represent the National M-17-A draft gear with certain attachments in various positions as indicated?

A. It does.

Q. Are the dimensions and the names of the various parts correctly shown?

A. They are.

[fol. 3092] Q. Are you also familiar with the model which is on the table before you which bears at least in one place a statement that it is a model of the National M-17 draft gear?

A. It is, about a quarter-size.

Q. Does the model also represent in all essential features the National M-17-A draft gear?

A. It does.

Q. What is the approximate scale of the drawing as compared to the size of the National M-17-A draft gear?

A. It is just a little under one-sixth size. Four inches is equivalent here to twenty-four and five-eighths.

Q. This drawing illustrates only one particular type of draft gear, does it not?

A. It does, yes, sir.

Q. Do friction draft gears in general operate according to the same principles which are indicated by the drawings on exhibit No. 210 for identification?

A. The same basic principles, yes, sir.

Q. Is the National M-17 draft gear and the M-17-A draft gear now in use upon freight cars according to your own observation?

A. It is, yes, sir.

[fol. 3093] Q. How long has it been in use?

A. To my knowledge, since about 1925.

Q. Would this drawing illustrate the operation of other types of draft gears so far as essential dimensions and length of travel are concerned?

A. It would, yes, sir.

Q. Are the dimensions and lengths of travel as indicated by the exhibit in accordance with A. A. R. standards?

A. They are.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: I was wondering what you meant, Mr. Bohnsteagel, when you said the drawing here is essentially correct, using the term "essentially"?

Mr. Mason: I don't think that was his answer.

A. I did say "essentially" but what I had in mind was that it is not detailed as to dimensions. It is to scale and is entirely correct in that respect, but not dimensioned in detail. That is the thought I had in mind.

Mr. Strouss: That is all.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 210.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 210.")

[fol. 3094] Q. Now, will you refer to exhibit No. 210, and particularly to the top drawing entitled "Normal Position." What is the relationship of the couplers to each other in the normal position?

A. The pulling and buffing faces are entirely free.

Q. When you speak of "buffing," do you mean pushing, equivalent to or for the purpose of pushing?

A. Yes, sir.

Q. And pulling, of course, is the opposite of buffing, I take it.

A. Yes, sir.

Q. I take it that the representation at the extreme left of the drawing indicates the coupler of an adjoining car?

A. It does.

Q. And then you have, commencing at that point, which is marked "coupler," an arrow showing the coupler of the car to which the draft gear is attached?

A. Yes, sir.

Q. In the first position you have the couplers in a condition where they are free of either buffing or pulling contacts?

A. Yes, sir, they are running free.

Q. In that position could the pin be lifted in either [fol. 3095] coupler?

A. Yes, sir.

Q. Without any change in the relative position of the cars?

A. Yes, sir.

Q. In what position is the draft gear in the first drawing, "normal position."

A. It fills the draft-gear pocket and the yoke and is not compressed beyond its own initial compression.

Q. Is the front end of the draft gear in contact with any particular part of the mechanism, and, if so, in what way?

A. The front end is in contact with the follower and the follower is in contact with the front end of the yoke and the butt end of the coupler.

Q. Now, is the back of the draft gear in contact with any particular portion of the draft rigging?

A. I should have added on that first question, the follower is in contact with the front draft lugs of the car, the rear end of the draft gear is in contact with the rear draft lugs of the car and with the rear end of the coupler yoke.

Q. And what is the relative positions of the coupler horn and the striking casting?

[fol. 3096] A. There is a space of three inches or over three inches in this drawing between the horn and the striking casting.

Q. When you refer to the coupler horn, just what part of the coupler do you mean?

A. That is a raised portion on the coupler bar that was put there in early car construction to contact the striking casting and help take the buff load on the car.

Q. What is the striking casting; is that a part of the end of the car?

A. That is part of the end sill or frame construction of the freight car.

Q. What does the striking casting consist of, is it wood or metal?

A. It is a steel beam or steel channel, often with a special casting on it to give added strength in the newer constructions.

Q. In normal operation, does the coupler horn ever contact the striking casting?

A. It is not intended to.

Q. What prevents the coupler horn from striking or contacting the striking casting?

A. The draft gear going solid on its own housing.

Mr. Mason: I wonder if counsel would object if we place [fol. 3097] the model before the Judge. It might be easier to follow.

Mr. Strouss: No, not at all.

Mr. Mason: In this normal position, is there any compression of the springs of the draft gear?

A. Only the intial compression of possibly a half inch or more, three-quarters of an inch, that the manufacturer builds into these draft gears to give initial compression resistance. It amounts to possibly five, ten or fifteen thousand pounds on the draft gear.

Q. There are certain friction members indicated by the drawing. Are the friction members in contact in the normal position?

A. They are; yes, sir.

Q. Going to the second drawing, or the center drawing called "Buff Position," what is the relative position of the couplers there?

A. The buffing faces are in contact, with seven-eighths of an inch of opening between the pulling faces; the draft gear is compressed its full travel, two and three-quarter inches, and fully contacts the buffing lugs on the car frame.

Q. Are those buffing lugs at the rear of the draft pocket?

A. They are; yes, sir.

[fol. 3098] Q. And known and identified in the upper drawing as the rear draft lug?

A. Yes, sir.

Q. And has the front end of the draft gear moved from the position indicated in the normal position drawing?

A. It has.

Q. In what direction, and for what distance?

A. Backward two and three-quarters inches.

Q. Has the coupler horn moved?

A. It has.

Q. The coupler horn of the car on which the draft gear under study is attached?

A. It has.

Q. Moved in which direction?

A. Also backward.

Q. How far?

A. Two and three-quarters inches, or within one-fourth inch of the line indicating the striking casting.

Q. Now, what is this seven-eighths of an inch of separation between the knuckles of the couplers called; what is that seven-eighths of an inch?

A. That is free-slack.

Q. What is this two and three-quarter inches of travel [fol. 3099] of the draft gear called?

A. That is controlled slack or controlled resistance.

Q. Is this two and three-quarter inches the maximum travel of the draft gear which can be obtained by maximum shock?

A. Except by deforming members beyond the designed travel.

Q. Well, without any deformity of the draft gear, is the two and three-quarters inches the total travel?

A. It is; that is the nominal travel.

Q. How much compressing or buffing shock is required for the National M-17-A in order to produce that total travel?

A. It will require 18,000 foot-pounds, which would be equivalent to a couple of loaded cars striking at four to five miles per hour.

Q. You spoke previously of three to five hundred thousand pounds?

A. That would be the static load or slow load that would have to be put on to do that.

Q. In the buff position, are the springs compressed?

A. They are.

Q. To what extent?

[fol. 3100] A. To within, just within being solid upon each other. The design requires that they must not go solid on each other, but must go solid on the housing, or a solid member of the draft gear.

Q. Are the friction members of the draft gear in contact?

A. They are.

Q. To what extent?

A. To the extent of resisting the three to five hundred thousand pound push that is being put on that.

Q. Now, going to the lower drawing, the one entitled "Pull Position," in what position are the couplers shown there?

A. The pulling faces are in contact with a seven-eighths inch space between the buffing faces.

Q. Is that the same seven-eighths of an inch that you designated previously as the free slack at the coupler faces?

A. It is.

Q. What has happened to the coupler horn with relation to the striking casting?

A. That is pulled away from the striking casting two and three-quarter inches over the three inches of its normal position, or five and three-quarters inches out.

[fol. 3101] Q. And is this pull position representative of the position which would be found where a locomotive is coupled to, and exerts a pull on a car?

A. That is an extreme position. A locomotive couldn't ordinarily exert that much pull; three hundred to five hundred thousand pounds.

Q. If the car were anchored and the locomotive were pulling, you would get something approximating this pull position, would you?

A. You would get half or a third of that possibly.

Q. Now, in the drawings marked "Pull Position," what is the position of the front of the draft gear? Is it the same in the normal position at the top of the sheet?

A. The first, the wedge part and follower are the same, they are contacting the pulling lug of the underframe, but the yoke and coupler butt have pulled away from the follower, and your force is exerted on the tail end of the yoke against the bottom of the draft gear.

Q. Is the draft gear itself in compression in the same manner as in the center drawing?

A. Absolutely. The only difference is that in the center drawing you are pushing on the head against the rear draft lugs, on the bottom drawing you are pushing against [fol. 3102] the front draft lugs.

Q. Do I understand, then, that whether you have extreme buff or extreme pull position, the draft gear is compressed in either event?

A. It is.

Q. Is that the normal functioning of every type of draft gear?

A. Every type of draft gear. They are never in tension, they are always in compression, either from the head backward or from the tail forward.

Q. Are the friction members in the same position with respect to each other in the pull position as in the buff position?

A. They are.

Q. And does the two and three-quarters' inches shown here represent the maximum amount of travel according to the specification and standard?

A. It does.

Q. Now, are draft gears in actual practice, particularly of the type represented on this drawing, are they ever lubricated, that is, intentionally lubricated?

A. There is one type built with lubrication.

Q. I mean, the M-17?

A. In the M-17, they are always in dry friction?

Q. Is there any type other than the one you have men-
[fol. 3103] tioned which is subject to lubrication?

A. Not intentionally, that I recall.

Q. Suppose that oil were to be spilled on a friction draft gear such as the M-17-A, would that rob the gear of any of its essential qualities?

A. It would reduce its resistance from a combined friction and spring to merely the value that the springs have in resisting compression.

The Court: But they are not intended to be oiled in any way?

A. Not the friction draft gears, with that one exception that I mentioned, the Edgewater, which is a ring-spring gear, and to avoid wear they are lubricated. The earliest one wasn't oiled either, but they got better work out of it by putting in a lubricated friction and spring.

The Court: The witness has indicated a time or two that he wanted to illustrate all this, and I suggest that off the record, because it wouldn't make much sense, that he do that now. Will you explain the model to us?

(Thereupon the witness explained the workings of the model draft gear to Court and counsel off the record.)

The Court: I think that illustrates it.

Mr. Mason: Mr. Bohnstengel, have you seen the National
[fol. 3104] M-17 and National M-17-A in actual service?

A. I have, yes, sir.

Q. Have you seen it applied to Southern Pacific cars?

A. I have.

Q. To Pacific Fruit Express Company cars?

A. Yes, sir.

Q. Santa Fe cars?

A. Yes, sir.

Q. Have you seen the various other types of friction draft gears now in use?

A. I have, yes, sir.

Q. And seen them applied also?

A. To various cars.

Q. Including Southern Pacific and P. F. E. cars?

A. Yes, sir.

The Court: Is there any particular difference in the coupler on the froight car, for instance, and on your passenger cars?

A. From Type E and D, from here (indicating) ahead, no. But from here back it may have a longer shank, may have a 60 or 70-inch coupler shank and fastened with a tail-pin instead of a key to your car, the reason being that on a passenger car you have the vestibule, you see, to get out under to the head end of the car, you need more coupler [fol. 3105] length and still put your draft gear back in the solid underframe of your car.

[fol. 3106] Mr. Mason: The coupler from the coupler horn forward is the same or substantially so?

A. Excepting tight lock. Tight lock has some gathering features that are not present in freight-car arrangement.

Q. You spoke in your reference to exhibit No. 210 of two and three-quarter inches as the travel of the draft gear in either direction. Is the same specification followed on other standard friction draft gears?

A. It is, yes, sir.

Q. Do they observe actually any lesser measurement than two and three-quarter inches or is that the standard?

A. Not less than two and one-half nor more than two and three-quarters, two and five-eighths is a pretty good average.

Q. You have spoken so far in your testimony largely of the friction-type draft gear. I take it that the National M-17-A represents the friction type draft gear?

A. It does.

Q. And that appears from the exhibit to be a combination of friction and springs?

A. It is.

Q. Do the springs themselves come into the picture and [fol. 3107] play a part in the operation as well as the friction members?

A. They do.

Q. Is there another type of draft gear heretofore in use other than the friction and spring or the friction draft gear represented here?

A. There is.

Q. Will you describe it?

A. The tandem spring was extensively in use before friction draft gears were developed.

Q. What was the earliest type of draft gear used in freight-car operation? Have you made any study of the history of draft-gear evolution?

A. There was none in the earlier years. It was simply connected to the car body and pulled on the car body, the resiliency of the car body was used as a means of cushioning.

Q. You mean the coupler was attached directly to the car?

A. Yes, or to draft rods passing under the car.

Q. What was the next development after it became necessary to provide some means of fastening the coupler to the car? Was there a spring used?

A. A spring was used, either a single, twin, or tandem.

Q. Is the tandem draft gear a gear still in use at [fol. 3108] times??

A. Yes, sir.

Q. About how much travel is there in a tandem spring draft gear ear to your observation?

A. Two to two and one-quarter inches.

Q. Is the friction draft gear a development from the tandem spring draft gear?

A. It supersedes the simple spring arrangement to get greater capacity.

Q. In the tandem spring draft gear as compared to the [illegible] pounds, which you mentioned as the force required for complete closure of the friction gear, how much force is required to develop the two to two and one-quarter inches of travel?

A. From sixty to sixty-five thousand pounds, but may I add that in some types of gears which are used on pas-

senger cars and that we use on locomotive tenders we still maintain for inch and one-half and for inch and three-quarters that tandem spring characteristic and have a combination of spring and friction as differentiated from simple friction or tandem spring.

Q. That is only on passegner cars and locomotives, is it?

A. We also have some of those on way cars as an easier cushioning device.

[fol. 3109] Q. Why is it necessary to have a draft gear on a freight car instead of having the coupler bolted directly to the underbody of the car?

A. You need a yielding resistance to protect equipment and also to guard against shocks.

Q. Does the draft gear play any function in absorbing shocks?

A. It does.

Q. Does it play any function in permitting easier starting of the train?

A. It does.

Q. Will you describe just how it functions in that respect.

A. The draft gear will move or yield under a load that the locomotive can put on that draft column in the so-called "taking slack" operation, and then start with a lesser pull than it would if you had to start the dead body of the train itself.

Q. Is this seven-eighths of an inch of free slack a part of the construction for the necessary functioning of the train in starting?

A. It is.

Q. What does that serve?

A. It serves as a yielding play or movement in making turn-outs, negotiating curves, and over bumps and through [fol. 3110] dips to avoid knuckle and coupler strain.

Q. Is there any other motion in the draft rigging other than the two and three-quarter inches of draft gear travel, and the seventh-eighths of an inch at the coupler faces which is developed in actual operation?

A. There is.

Q. How is it developed?

A. Due to wear and upset parts.

Q. You mean actual distortion or breakage?

A. No, the continuous bumping of the end of your coupler would shorten it to a certain extent, a thirty-second or sixteenth of an inch or so, and your draft gear key illus-

trated in the drawing, the coupler yoke key will show a certain amount of wear where it is contacting and pulling the load, and gradually develop a little extra free slack.

Q. How much can be developed before the draft rigging has to be replaced?

A. The sum total, I believe, that the Association permits is one and one-half inches all told.

Q. Including the seven-eighths?

A. Exclusive of that seven-eighths per car end, but I don't recall ever seeing that much develop in any cars I have inspected.

The Court: We will take our noon recess at this time.

(Thereupon the court stood at recess until two o'clock this day.)

[fol. 3111] January 28, 1941, Two o'clock P.M.

The witness Walter Bohnstengel was recalled to the stand, and proceedings were resumed as follows:

The Court: You may proceed.

Mr. Mason: Mr. Bohnstengel, do all gears now in use; by that, I mean particularly friction draft gears of the type indicated by your exhibit 210 meet substantially the same standards as to capacity to absorb compression or shock?

A. They do.

Q. And what is the standard which they have to meet?

A. It is the specifications of the manual of Association of American Railways.

Q. Well, pounds of force applied to the gear to produce compression; what is the minimum amount of force?

A. Expressed in foot pounds, 18,000 foot pounds, or the equivalent of three to five hundred thousand pounds of push.

Q. You speak of three to five hundred thousand pounds of push. Is that the same character of pounds that are used in measuring the tractive effort of a locomotive?

[fol. 3112] A. The same designation, same values.

Q. Suppose we have a locomotive with tractive effort of 124,000 pounds coupled to a car equipped with a gear such as the M-17; does that mean that the locomotive can

pull only 124,000 pounds at the coupler to attempt to close the first draft gear?

A. That is all it can on slow steady load; that doesn't include impact.

Q. I am speaking of pull.

A. You are correct there.

Q. When pull is applied or impact is applied upon a draft gear, a certain amount of energy is required in order to apply that impact or pull, is it not?

A. Yes, sir.

Q. What becomes of that energy in so far as the draft gear is concerned?

A. The compression of the springs through distance against resistance and heat.

Q. You speak of heat. Is some of that energy passed off as heat by the draft gear?

A. A certain amount depending on how much is put in there.

Q. Where is the heat developed, and where is it dissipated?

A. Between the friction surfaces and radiated to the [fol. 3113] atmosphere.

Q. Then the function of the friction members is to transfer the energy of the striking or pulling, in so far as the draft gear is concerned, into heat which is dissipated into the air?

A. Yes, that would be the interpretation.

Q. Is it possible by the tests which you have mentioned, to develop the amount of compression for which a draft gear is built and the amount of its capacity?

A. That is one of the purposes of the test.

Q. Is it possible to measure the amount of compression as to capacity accurately or precisely?

A. Fairly so.

Q. Within what limits expressed in percentage?

A. It ought to be within ten per cent or less.

Q. Would it be as close as five per cent?

A. Probably as close as that, depending on how slowly you go to it, to repeat your operation.

Q. Have you, on the Santa Fe, made any tests of draft gears in actual operation upon particular cars?

A. We have, yes, sir.

Q. Will you describe the test that you have in mind?

A. In 1927, after some tests that we had made of draft [fol. 3114] gears, a joint test sponsored by the New York Central, the Santa Fe, the Milwaukee and the Nickle Plate Railroads, we built 150 70-ton gondola cars for sulphur service, hauling sulphur between Galveston and the mines, and as these cars operate in one particular service and in a restricted territory, it was decided to put six different kinds of draft gears, 25-car sets each, on these 150 cars. At that time we put in Cardwell Miner, National M-17, Edgewater, Waugh-Gould, and Westinghouse, and these cars were inspected to start with, at the end of three months, then six months, and then a year, two-year periods, with the idea of observing the action of the draft gear and the behavior, anything that could be seen from it, and measurements as to slack development, to get an idea of which would be the most desirable draft gear of the groups that were then available and considered satisfactory for freight service.

[fol. 3115] Q. Are some or all of these 150 gondola cars still in service?

A. They are, yes.

Q. Have you made further inspections of that equipment during the past two years?

A. The last inspection that I started on was early in December of last year. I didn't follow it through, I had an assistant follow it through and haven't had time to analyze the figures.

Q. Did you endeavor by that experiment or test to develop the capacities for wear and the endurance of the draft gears as well as their characteristics in service?

A. Observation to notice the performance as indicated by its action on the coupler.

Q. From your experience, Mr. Bohastengel, is it possible in actual operation to develop full compression or full extension of a draft gear?

A. Not simultaneously. You can develop one or the other with suitable conditions, but in actual service conditions you wouldn't have a condition that would develop from one extreme to the other.

Q. Would the maximum travel be developed from normal to, let's say, full buff position in an ordinary operation?

A. That would be possible, yes.

[fol. 3116] Q. Will you give us an example?

A. A train moving and setting the air on the locomotive, the train would push into a full buff of gears throughout part of the train at least.

Q. Suppose that you make a switching coupling between locomotive and car or between two cars, let's say, at a speed of four or five miles an hour, will that develop a full buff?

A. That will probably develop a full buff and also a reprimand for doing it.

Q. That would be rather a high-speed coupling, would it?

A. I would consider it so, yes, sir. There is no objection to moving four to five miles up to the place you are going to make the coupling, but to make it at four or five miles is rather severe.

Q. Will that severe coupling develop full travel from full extension to full compression?

A. It will develop it from normal to full compression.

Q. From normal to full buff, it is under compression at either of the extremes?

A. It might do this, when you make that kind of a coupling, it might kick the one or two cars ahead hard enough to jerk and break the knuckle. It might go in with a double [fol. 3117] action of compression and jerk, but they would be successive.

Q. You speak of breaking the knuckle. I take it that the various parts of the draft rigging are built to a certain standard of resistance to force, is that correct?

A. They are, yes, sir.

Q. What is the standard resistance to force of the coupler head apart from the knuckle, disregarding the knuckle for the moment, what is the breaking point there?

A. It is usually considered six hundred thousand or over.

Q. What is the breaking point of the coupler shank?

A. That would be as a unit from knuckle to shank because you would have to put a high elastic or especially strong knuckle in to develop the full strength of your coupler.

Q. Have the draft lugs in the gear pocket any standard of resistance to breakage or distortion?

A. They try to exceed the strength of the coupler or knuckle or yoke so that the removable member will fail before those elements will fail.

Q. As to the draft gear itself, as you said, it will go solid after a million pounds more or less?

A. Something of that nature.

[fol. 3148] Q. What is the breakage point?

A. The members being under compression at all times will begin to shorten at seven or eight hundred thousand or maybe a million pounds and your specifications allow only a certain amount of shortening, based on a certain number of over solid drops.

Q. The knuckle itself, is that built to a particular breaking point?

A. The older knuckles were in the neighborhood of 350,000 to 400,000 pounds. Newer type D, which has been in service for many years are usually thought of as about 500,000 pounds and the type E possibly around 525,000 pounds.

Q. Matching all these together, the knuckle appears to be the weakest member of the entire chain of connections collectively known as the draft rigging?

A. That is the intention, that is the easiest member to replace.

Q. Is it, so to speak, the fuse?

A. Just exactly, that would be the electrical designation of it; the part that would yield with the least amount of injury to equipment.

Q. When a train is made up and is traveling on the line, how much of the movement of the draft gear will be de-

[fol. 3149] veloped in ordinary operations?

A. That depends on your grade and the speed at which you are going. If you are starting and developing full locomotive tractive effort, 75,000 or 100,000 pounds, you will probably develop one-third or half travel of the draft gear from neutral to the full position. If you get a jerk in there, you may get a little more.

Q. Would that occur throughout a train of one hundred or one hundred twenty-five cars?

A. That would occur at the head end; the tail end would follow with less effort.

Q. Would this travel that you speak of in the draft gear be in addition to the seven-eighths of an inch of what you call "free slack" at the coupler facing?

A. It would; yes. By way of explanation there, I might point out one thing, that seven-eighths of an inch of so-called "free slack" in your knuckle, when you round

a curve or turn-out you have nothing. It is utilized to permit an angling of your coupler and it would disappear. If you didn't have it there, your train would naturally put it there and strain your equipment, so design has put it there to start with.

Q. Would it be possible by the application of a steady [fol. 3120] pull of a locomotive of a train which was being started and moved to develop the entire two and three-quarter inches of travel from normal to pull position, which is indicated by the lowest of the three drawings on exhibit No. 210?

A. It would be in the head end of the train on a number of cars but not on the rear of the train.

Q. You say it would be possible to develop the full travel by applying 124,000 pounds of tractive effort to the front car?

A. Not by 124,000, it would take more than that either in pull or in impact.

Q. I spoke of a steady pull.

A. I didn't understand it. I missed the "steady"; I understood "pull."

Q. In your experience, taking into consideration both the free slack at the coupler faces and the controlled resistance in the draft gears, what is the approximate amount of the movement per car of the train which would be developed in service conditions in the ordinary freight train expressed in inches?

A. A little over six inches.

Q. Will that be the average amount of motion including both free slack and controlled resistance?

A. That has been my experience.

[fol. 3121] Q. Have you conducted tests or measurements for the purpose of arriving at that figure?

A. We have.

Q. How do you get at that figure of six inches plus apart from any experiments or any trains that you have seen operating? Can you point out the factors on the drawing, exhibit No. 210?

A. If you are operating your train on some pull, you will extend part of that two and three-quarters inches at the head end of the train and very little of it past the middle or rear end of the train because your draft gears normally have five, ten, to fifteen thousand pounds initial compres-

sion, or it would take a pull of that much to even start them moving. If you were to set the brakes suddenly and could realize a complete compression from them throughout the train, you could only realize the two and three-quarters inches maximum plus your seven-eighths, or just a little over three inches per car end or a little over six inches per car throughout the train. You couldn't be fully extended throughout the train and then get full compression throughout the entire train. That is not a physical possibility in train operation.

[fol. 3122] The Court: Are you making any allowance in that computation for the play that you testified to this morning that would occur after the parts had been in use for some time of one-and-a-half inches?

A. That one and one-half inches, your Honor, part of it, assume that a half inch of it would develop in the gear pocket where you normally have two and three-quarters inches of engagement, and you develop one-half inch of free play in that gear pocket, that would restrict your controlled movement to two and one-quarter inches, it would take care of most of it, but not quite all of it. My figure, to answer your question without the illustration, it would take care of most of that inch-and-a-half allowable free slack.

Mr. Mason: And another portion of that inch-and-a-half is simply additional wear at the coupler faces over and above the seven-eighths' inches, isn't it?

A. No, that inch-and-a-half is from the coupler horn back.

Q. Now, do draft gears operate in one manner to absorb or reduce shocks which may arise in the movement of the train?

A. That is one of their functions.

[fol. 3123] Q. In what way do they operate to that end?

A. They cushion and gradually hold back as far as they can an impact that is coming toward closing them, instead of having a buff with a high shock, they cushion it the same as you would with your hand.

Q. Do the draft gears in actual operation tend to increase or reduce shocks at the rear end of freight trains?

A. They tend to reduce them.

Q. Suppose that because of features of operation, such as the movement of a train over a slight hogback or hump

or slight sag in the lines, there is a difference in speed as between adjacent cars or cars in different parts of the train, do the draft gears tend to absorb those differences in speed?

A. Yes, sir, they do, they iron it out and even it up.

Q. Does the draft gear function generally in any respect like the net of a trapeze performer?

A. That would be one way of thinking of it, it yields and then comes back to be in position to yield again.

Q. We have before us on the table here and in the drawing the reduced size of draft gears you testified pre- [fol. 3124] viously. What does the National M-17-A Draft gear actually weigh?

A. About 400 pounds. I would have to check my figure on that. I don't recall. I made tabulations some time ago, but I didn't try to commit them to memory.

Q. I show you a tabulation which appears to be in your handwriting and ask you if you will show that to Mr. Strouss, although it is your handwriting.

A. The weight in pounds of the National M-17, the second one with one follower, 441 pounds. The follower weighs 71 pounds, so it would be 370 pounds for this much of the draft gear, and the follower 71 pounds, 441 pounds.

Q. Now, what are the foot-pounds of capacity that that draft gear has?

A. On the official test, the average is 20,700 foot-pounds.

Q. What is that equivalent to in pounds of the same character as are used in measuring tractive effort?

A. That would be about 495,000 pounds.

Q. Is that draft gear generally typical as to weight and capacity in foot-pounds or any other measurement that you have recited?

[fol. 3125] A. The lowest weight that I have recorded is 333 pounds, and the highest weight 520 pounds for a draft gear for one car end, not both draft gears.

Q. There is a draft gear, of course, at each end of every freight car?

A. Yes, sir.

Q. Are there draft gears of higher capacity than the National M-17-A?

A. There are draft gears of higher capacities, and there are individual draft gears of the M-17 type that will, as they get a truer friction surface, develop higher capacity.

Q. But the capacity you spoke of, 495,000 pounds, is representative of the class?

A. It is representative; it may be a little more or less; it must be at least 18,000 or 440,000 pounds, something of that magnitude.

Q. You say 18,000?

A. 18,000 foot pounds.

Q. Just for the sake of the record, Mr. Bohnstengel, will you describe what you mean by a foot-pound? Do I understand that that is the force developed by the movement of a pound one foot vertically?

A. The way foot-pounds are figured in draft gear tests is to raise a hammer, let us say, the old 9000 pounds one [fol. 3126] foot, and that would be 9000-foot pounds, or if it drops two feet it develops 18,000 foot-pounds potentially at the instant that it strikes.

Q. I understand that that is complicated by the fact that where gravity is the impelling force the force increases with the square of the distance, doesn't it? Isn't there some such formula as that?

A. Yes, energy varies as the square of the impact speed, doesn't it; isn't that the relation?

Q. I remember some formula which would indicate that the energy of dropping 9000 pounds two feet would be greater at the point of impact than the energy of dropping 18,000 pounds one foot, because of the difference in the length of travel. 18,000 pounds dropped one foot would be 18,000 foot-pounds, but that doesn't work indefinitely; if you were to stretch it out to 300 pounds dropped thirty feet, you would get more than 9000 pounds dropped one foot?

A. By way of explanation there, a car coupling at two miles per hour has an impact force of four, the square of two; or four; at three miles per hour, the impact value, or the destruction value is nine. It varies as the square [fol. 3127] of your impact speed.

Q. Now, getting to the dropping of a weight, the law of gravity leads to the conclusion that the greater the distance of drop, the greater the speed at the point of impact; isn't that right?

A. I think that is right.

Q. And by that same formula, the force is equal the mass times the square of velocity?

A. Mass times velocity squared.

Q. A lesser weight from a greater height would lead to more force at the point of impact than to drop a greater weight a less height, even though the product of height times weight would be the same in both cases?

A. You are quizzing me on mathematics that I haven't thought of for some time, your Honor.

Q. I will abandon the question. Why did you go from a 9000-pound hammer to the 27000-pound hammer?

A. Because of the great surface disturbance and heat created by impact, which would not be as representative as a lower drop which just had the foot-pounds available.

Q. Which, in other words, represented merely the application of the weight without the force of the drop, is that correct?

[fol. 3128] A. Yes; in other words, if you take a small hand hammer and hit a heavy object at a high speed all you do is to disturb the surface. If you take a massive weight and just drop it at a small height but enough to be greater than that would resist, it would put an actual bend in it. You could hit all day with a small hammer and, surface-peck the thing. By the way, that 9000, I understand, was an accident too. They had a ten thousand weight on their first hammer, where I can't tell you, but they were going to use the 10,000 pound weight to do their dropping and they didn't have enough motive power to lift it; so they took off a thousand pounds to fit the job to the conditions that existed.

Mr. Mason: I think that is all. Thank you, Mr. Bolinstengel.

Cross-examination.

By Mr. Strouss:

Q. I had intended to ask you the question Mr. Mason asked you about the effect of speed, what effect it would have as to increasing the force of the impact. That law of physics was mentioned, mass times velocity squared is the force that applies not only in the case of gravity but any [fol. 3129] time where there is speed applied, Mr. Bolinstengel, mass applied to force, isn't that true?

A. I believe it does. Now, you see, with the 9000-pound hammer, we went up in one-inch increments, with the

27000-pound hammer they go up in half-inch increments, or quarter-inch increments.

Q. But, using an illustration other than the application of the force by gravity, using the locomotive that Mr. Mason referred to.

A. Yes.

Q. Having a tractive effort of 124,000 pounds, of course, the force with which the pull or impact the force pulled at the time of pull or impact would depend upon the speed as well as the tractive effort of the locomotive, isn't that true?

A. You could run into it, you could take slack and then run and you have your equation of tractive effort, it wouldn't hold at all.

Q. Well, your mass by velocity squared——

A. Well, you are developing kinetic energy.

Q. Would the formula of mass times velocity squared apply?

A. It would apply in that case.

Q. The same way with a car, the mass of a car, the pull or impact would depend upon the speed with which it is moving?

[fol. 3130] A. Yes, it is proportional to the mass and the velocity squared, if I remember, the impact.

Q. I just wonder if you would agree with this statement, Mr. Bohnstengel: "Draft gears in fair to good condition are not pushed in for pulled out, they are either driven in or jerked out, both implying a severe shock." Do you agree with that statement?

Mr. Mason: May I ask what document you are reading from, Mr. Strouss?

Mr. Strouss: I am reading from the air-brake rules and regulations of the Southern Pacific Company.

A. As a regular operating condition?

Q. Yes.

A. You don't get that at a truly slow speed, you have to have something more than a run-in or a push; there has to be some kinetic energy there, rather than just slow moving.

Mr. Strouss: Or, as used here, driven in or jerked out.

A. Driven in or jerked out.

Mr. Strouss: That is all.

Redirect examination.

By Mr. Booth:

Q. Take an automobile weighing a thousand pounds and [fol. 3131] running into a stone wall at the rate of five miles an hour, a speed of five miles an hour, does it make any difference whether that automobile travels twenty feet or twenty miles at five miles an hour as to the impact?

A. If, at the instant of impact, it is going five miles an hour, that is the thing that counts. How long it was in getting that speed wouldn't be a factor, it is just what it is doing at the instant of the impact.

Q. If one car runs into a stationary car at the rate of five miles an hour, it doesn't make any difference how far that car has run?

A. No, it is the rate at which it strikes.

Mr. Booth: That is all.

Mr. Strouss: That is again the application of that formula?

A. Yes, MV Square.

Mr. Strouss: That is all.

The Court: There is one question the Court would like to ask. This exhibit 210, of course, I take it, purports to show a single draft rigging complete with the coupler on the left here, which, I take it, is attached to the other car?

A. Yes, sir.

Q. Now, in making your computation as to the slack or [fol. 3132] play, if I may use those terms, I have forgotten what you used, between the two cars, are you taking into consideration the play in the draft-gearing at the end of the car where the coupling is made?

A. There shouldn't be much play in the draft gearing itself in the pocket.

Mr. Mason: I think what his Honor meant was, did you take into account your six plus inches per car in the train, the play in the draft gear at the end of each car, plus whatever play there may be in the couplers, is that what you had in mind?

A. That is what I tried to do when I was adding two and three-quarters for the one and two and three-quarters for the other, that is five and a-half, plus your seven-eighths,

is six and three-eighths, plus some free slack between six and seven inches, that is what I had in mind from a neutral to a fully compressed condition.

The Court: Then, in any given train length if you would multiply the number of cars by six inches plus, you would arrive at the total possible slack in that train?

A. The slack that you would ordinarily be able to develop by tying down an end and pushing in and pulling out. Now, you could run in real hard, tie down with a couple [fol. 3133] of locomotives at the end and get a lot of impact; you could increase that, but what you could develop ordinarily under normal operating or handling conditions, that is what I tried to show. You see, potentially you have four times this two and three-quarters plus the seven-eighths before you would start breaking anything, but you can realize of that only a little over six inches per pair of cars or per car. Do I make myself clear there?

The Court: Yes.

[fol. 3134] Mr. Mason: You spoke of slack in answer to the Court's question. Do you have in mind the two components of that slack that you described before, controlled resistance in the draft gear and the free motion of the couplers?

A. I was using the Judge's broader term as it is occasionally used in operating, slack, whether it is controlled or free.

The Court: Do I understand you in normal operations the weak point in this connection is the knuckle?

A. That is the intention of car construction because all you need to do is to pull the pin and put in a new one, while if you break a coupler your car is disabled and has to go to the repair track, or if you break a yoke your car is disabled.

The Court: In normal operations, would it ever occur that this draft gear would be pulled out? By that I mean that your break would occur there?

A. The possibility would be that these lugs designated as front draft lugs, that that bunch of rivets could be sheared. If they had less than the 500,000 pounds strength, you might pull coupler, yoke, draft gear, and all out. In other words, you would get the whole insides out of the [fol. 3135] car.

The Court: Does that occur in normal operation?

A. The cars are at present built or riveted strongly enough so that there is a good safety factor for the yoke or the knuckle. It is rather expensive to get that part when a lesser thing would be better to come out.

Mr. Mason:

Q. Mr. Strouss asked you in referring to page 12 of the Southern Pacific's air brake rules and regulations whether you agreed with that statement as to draft gears, that they are either driven in or jerked out. Do you necessarily mean in your agreeing with that statement that they will be either driven in or jerked out to the full extent of the two and three-quarters inches of travel indicated by exhibit No. 210?

A. The answer that I had in mind, Mr. Mason, was that we seldom slowly push in or slowly pull out a draft gear. In other words, you may get the first one but by the time you reach the second or third one you are moving to a certain extent and you get that much of an impact drive or impact jerk. It doesn't necessarily mean that it will come all the way. It may come halfway or two-thirds of the way [fol. 3136] or get the next car started without coming at all.

The Court: What happens to your draft gear, if anything, we will say with a head-on collision? Does it have any injurious effect to your draft gear rigging?

A. With a head-on collision?

Q. Or rear-end either; I take it the effect would be the same?

A. I would look for coupler shank shortening, your coupler shank should begin to shorten at about 600,000 to 650,000 pounds. You would absorb a little of your work and energy in shortening that. You would compress your car underframe; you might shear off some of the lugs, depending on how heavy the shock or uncushioned the shock would be. You might shorten a draft gear housing one-eighth or one-sixteenth or three-sixteenths of an inch. You could stretch the yoke to a certain extent or bend the key in a little bit where it pushes on the key or if it reaches that far. There would be several places of give and then it would tend to spring back again. Your car frame I think is built for about 800,000 pounds push before it starts to

yield and that would mean you would have some elastic compression of that which would spring back when your force was taken off.

[fol. 3137] Q. I believe you testified that so far as draft springs themselves were concerned that they were so cushioned and protected that they couldn't be broken?

A. The specifications require that they be so designed in length and spacing that the gear should go solid on its housing rather than solid on the springs with just the thought that you expressed that they should stay operative. If you would put the springs solid first, as some defective draft gear might in older times, you would tend to break the coil springs and would have an inoperative draft gear as the result.

Q. I notice that this exhibit refers to M-17, M-17-A and M-17-A (Certified). Do those cover essentially the same type of draft gear rigging but the later numbers having some slight improvement, or what does that indicate?

A. The M-17 draft gear was the designation under which the National Malleable and Steel Castings Company marketed a gear of essentially these dimensions, sizes, and parts. Then after a few years' service they found that these brass pads in the wedge were battering down or beating out, due to lack of lubrication, so they put in graphite plugs in there and changed the angle of the wedge [fol. 3138] two degrees from thirty to thirty-two, as I recall, and improved the wear by case hardening the stem from 400 Brinell to 700 Brinell hardness and left the wedges at 400 and gave that gear a new designation, M-17-A, under which designation it was tested and approved according to the specifications of the Association of American Railways. Then a few years later they obtained permission from the American Railway Association to take some of the older gears that had been sold or had been manufactured and might not have been sold but were on hand, several thousands of gears, and replaced parts in those gears to make them the equivalent of the M-17-A as far as their tests show, which they designated as the M-17-A (Certified) gear. Your M-17-A (Certified) would have a date prior to the time that they got their certificate of approval, it would have a casting date.

Q. But the basic principles in all three are the same?

A. If they would set the three out here, unless you knew the details of difference, you probably wouldn't be able to

recognize or distinguish one from the other, they would look essentially the same. They may have had several thousand draft gears on hand which couldn't be marketed [fol. 3139] as a certified or approved gear.

Mr. Mason:

Q. They couldn't be marketed as M-17-A unless they were fixed up?

A. Unless they were conditioned to be the equivalent of them.

Q. Did you make an inspection of the P.F.E. yard here in Tucson to see whether the National M-17 or M-17-A gear was applied?

A. I did, yes, sir.

Q. Do you remember how many cars you examined?

A. I think I examined about 244 car ends.

Q. How many National M-17-A's did you find in percentage?

A. Approximately 20 per cent, a little over 20 per cent were M-17-A's, without knowing whether it was M-17 or M-17-A, but the M-17 National gear.

The Court: You stated that these gears known as M-17 have been in use since the year 1925?

A. That is when the earliest service applications were made as far as I can find out. I rode back of some of them around 1925, as I recall, or late in 1925, in locomotive tenders.

Q. Do I understand that this particular type of draft gear designated on this exhibit No. 210 is considered the latest word in draft gears in railroading?

[fol. 3140] A. One of a group, not picked out as an individual but picked out as one of a group of a dozen draft gears.

Q. Do these other draft gears have the same basic principles or in what respects do they differ from the one shown here?

A. The Miner draft gear instead of using a stem with your friction segments around it, uses a barrel with friction shoes in it and a wedge and drives out; it uses a spring. I made some sketches just for my own information on that. Waugh Gould of which there are a good many in service use a pair of half-wedges and flat curved springs in between them to give the friction action. The Edgewater, which is

an approved gear, uses rings about one and one-half inches thick and nine inches in diameter, an inside ring and outside ring of corresponding taper and they force probably a pile twenty inches high, which would be in the neighborhood of twelve or fourteen rings, and they push them together, which when they go solid they go solid on each other. The Waugh-Gould 410 has put the springs on the outside and put the wedges in between. The Peerless, the Westinghouse, they use a barrel with a wedge to drive shoes out into the barrel and keep from pushing it in and a spring, [fol. 3141] of course, inside the barrel to keep the whole system tight, and the Cardwell, which if you have ever looked under a freight car is the one that has two broad springs on each side of the draft gear. They keep tension on some wedging elements which straddle some triangular shoes but it is all a principle of either barrel or stem and wedge and shoe, spring controlled, so that you get a component of your spring action translated into friction to give you the desired capacity which in the old A.R.A. tandem spring would be from sixty to sixty-five thousand pounds, as I stated this morning, and in this will be from three hundred to five hundred thousand pounds with less tendency to recoil.

Q. Then do I understand that the mechanical division of the A.A.R. of which you are a member approves of all the different types you have been describing here just now?

A. As shown in the Code of Rules, yes, sir.

Mr. Mason: One other question; you spoke of observing on the P.F.E.'s that you inspected some 20 per cent of National M-17's or M-17-A's. Were the other 80 per cent all friction and spring draft gears?

A. On the P.F.E.'s I saw no spring draft gears. I saw [fol. 3142] one Bradford rocker type, which is a spring and lever combination. I saw some Edgewater ring springs, some Waugh-Gould's as I just described, some Miner.

Q. Were they all friction draft gears?

A. They were all friction draft gears, yes, sir.

Mr. Mason: That is all.

The Court: We will take our afternoon recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

Mr. Mason: I take it that Mr. Bohnstengel is excused.
Mr. Strouss: Yes.
(Witness excused.)

B. S. Sines was recalled for further

Direct examination (continued).

By Mr. Mason:

Q. Mr. Sines, have you a statement before you in one sheet entitled, "Number of Passenger Trains of Different Lengths between El Paso, Texas, and Tucumcari, New Mexico, Year 1939"?
[fol. 3143] A. I have.

Mr. Mason: May we have this statement marked "Defendant's Exhibit No. 211"?
The Court: It may be marked for identification.
The Clerk: Defendant's exhibit No. 211 for identification.

Mr. Mason:

Q. From what sources was this exhibit prepared?
A. These were made from the passenger conductors' wheel reports for the territory El Paso-Tucumcari.
Q. Was it prepared under your direction?
A. It was.
Q. Has it been compared against the original sources?
A. Yes.
Q. Will you refer to the previous exhibits and state whether or not this exhibit is in any sense a companion?
A. It is companion to exhibit No. 188 previously introduced and completes the showing for the entire passenger operations from Los Angeles to Tucumcari, New Mexico. Exhibit No. 188 covers the territory Los Angeles-El Paso and this one goes on from El Paso to Tucumcari.
[fol. 3144] Q. This is really then a supplement to exhibit No. 188?
A. That is right.
Q. And for the same purpose?
A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?
Mr. Strouss: No; I have no questions.

Mr. Mason:

Q. Did you state whether the exhibit is true and correct?

A. It is.

Mr. Mason: We offer exhibit No. 211 in evidence.

Mr. Strouss: I object to it as irrelevant and immaterial.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 211.")

Mr. Mason:

Q. Is there any figure on this exhibit, Mr. Sines, that you wish to call particularly to the Court's attention?

A. Yes, the figures in the last line showing that during the year 1939 we had occasion to run between El Paso and Tucumcari 52 trains with a consist of over 14 cars.

[fol. 3145] Q. Will you take up now a statement in one sheet entitled, "Tucson and Salt Lake Divisions, Locomotive Assignment as of November 30, 1940"?

A. Yes.

Mr. Mason: May we have this exhibit marked No. 212 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 212 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 212?

A. It was prepared under my direction and checked by me.

Q. From what sources?

A. From report furnished each month by the motive power department showing what the assignment of locomotives has been for the previous month, or, rather, for the month ending with the day the report was issued. You will notice the title says, "Locomotive Assignment as of November 30, 1940." The assignment for that month is for the month of November.

Q. Have you the report for November 30th, 1940, available here?

A. I have.

The Court: This exhibit includes both freight and passenger locomotives, Mr. Sines?

[fol. 3146] A. That is right.

Mr. Mason:

Q. Have you shown the segregation of freight and passenger locomotives for each division as to types?

A. I have.

Q. Is the exhibit true and correct according to the underlying documents?

A. Yes.

Q. Will you furnish that to Mr. Strauss if he wishes it?

A. All right.

Q. When you speak of the Numbers (Not Continuous), does that mean the numbers of the locomotives assigned that fall within the range of numbers as shown?

A. That is right.

Q. Those are simply the locomotive numbers stenciled on the sides of the individual engines, are they?

A. That is all.

Q. They don't have anything to do with the engines other than as a means of identification?

A. That is right.

Q. Has the exhibit been compared?

A. Yes.

Q. Will you say whether it is true and correct?

[fol. 3147] A. It is.

The Court: Isn't it true in numbering those engines, for instance, you wouldn't put a four thousand number on a Mogul, would you?

A. No, those numbers are assigned at the time the locomotive was originally put into service or manufactured and that series of numbers stays with that locomotive until the end of the locomotive's life or until the end of the life of that particular type of locomotive.

The Court: That was my understanding.

A. Yes, sir.

Mr. Mason:

Q. For example, you can always tell that a 3600-class locomotive is in the F type?

A. Yes.

Q. And a 3700 class likewise is a particular series of the F type?

A. That is right.

Q. You can always tell that a 4300-class locomotive is a Mountain type?

A. That is right.

Q. Is that indicated to some extent by this exhibit?

A. Yes; in speaking of engines, railroad employees use all three methods shown in columns B, C, and D to identify [fol. 3148] locomotives or types. They will speak of them as "F's," as "2-10-2's," or as "3700's" and they all mean the same thing.

Q. Even sometimes they personalize the locomotive by calling it "the 3720," don't they?

A. That is right.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: We offer the exhibit as defendant's exhibit No. 212.

Mr. Strouss: I object to that part of the exhibit relating to the Salt Lake division as irrelevant and immaterial.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 212.")

Mr. Mason:

Q. Mr. Sines, the record is not so far I think entirely clear as to the tractive effort of these Articulated-Consolidation locomotives in the 4000 series, which you show in line 12 here. Can you tell from the locomotive books what the tractive effort of that series of locomotives is?

A. Yes, the tractive effort is 90,940 pounds. This is the locomotive book I have here in my hand that you mentioned [fol. 3149] last week, but I didn't happen to have it with me at the time.

Q. What is the tractive effort of the 5000-class locomotives shown in line 15?

A. From the same book, 84,200 pounds.

Mr. Mason: I think the record shows it but I want to be sure.

Q. Is there any other showing on exhibit No. 212 to which you wish to direct attention?

A. With the exception of the Articulated Consolidation engines, the assignments on both divisions are much alike. The passenger power is much the same. The principal passenger engines on both divisions are the Mountain type 1, 3, 4, and 5. We use F-4's and one F-5 on the Tucson division. We use F-4's on both divisions and one F-5 on the Tucson division.

Q. I take it that these Moguls and Ten Wheelers are in use in branch line or other similar service on the two divisions?

A. Yes, branch line and local service.

Q. Have you a statement before you in one sheet entitled, "Lengths and Capacities of Main Line Sidings in Arizona, Yuma-Arizona State Line to Arizona-New Mexico State Line Via Gila and Bowie, Year 1912"?

A. I have.

[fol. 3150] Mr. Mason: May we have this statement marked "Defendant's Exhibit No. 213"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 213, for identification.

Mr. Mason:

Q. Did you prepare or cause to be prepared exhibit No. 213 for identification?

A. I did.

Q. And the sources are as shown at the foot of the exhibit?

A. That is right.

Q. Did you insert any information as to the length or anything else shown in columns B and C?

A. Yes, clear length is taken from the Tucson division timetable and the capacity in column C was computed by myself.

Q. You show the bases of the computations, do you, on the exhibit?

A. That is right, in the lower righthand corner.

The Court: I thought the testimony the other day was that the cars had a length of 46 feet?

A. They do now, but this is in 1912 and that length of 44 feet is from our engineering department's records on the basis they were using at that time.

[fol. 3151] Q. But the length now is 46 feet?

A. Yes, the average length of car used in computing siding capacity.

Mr. Mason:

Q. Now as to the locomotive length of 80 feet, is that considerably shorter than present-day main line locomotives?

A. Yes, our main line locomotives now are from 100 to 126 feet in length.

Q. I take it by this exhibit you are attempting to present the situation as it existed in 1912 with reference to 1912 equipment?

A. That is right, to show the situation that existed in 1912 when the Arizona 70-car limit law was passed.

Q. You show the situation as of December 22nd, 1912, by timetable No. 71. Was there any substantial change during the year 1912 of which you are aware according to the records?

A. I don't know. I have the file of all the Tucson division timetables and I didn't examine them particularly to see if anything in particular had occurred in 1912.

Q. Subject to examination of the prior timetables, Mr. Sine, is it fair to assume that this represents the condition as of the beginning of 1912 as well as at the end?

[fol. 3152] A. Yes, railroad plants don't change overnight or in the space of a few months; they are the gradual development of a number of years and within any shorter period of years a statement of this kind probably reflects a condition that existed over a twelve-month period.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Do you have the underlying sources in connection with this exhibit available for examination if necessary?

A. Yes, I have the Tucson division timetables, including timetable No. 71, right here with me.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 213.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 213.")

Mr. Mason:

Q. Mr. Sines, I should like to ask you about some of these sidings. You show, for example, at Mohawk a capacity of 99 cars. Is that all on one siding?

A. No, the information that I took from time-table No. 71 is shown in column B and was expressed in "length of [fol. 3153] sidings, within clearance (feet)." I have duplicated those figures exactly in column B. The timetable does not indicate whether there was one or more tracks at Mohawk at the time the timetable was printed, but there are two tracks at Mohawk now of somewhat similar length and my conclusion was that there were two tracks at Mohawk at the time this timetable was printed because there would be no particular reason for changing the layout at Mohawk by taking up one track.

Q. Or by converting two sidings into one long siding?

A. That is right.

Q. Does the same situation obtain at Aztec where you show 101 cars?

A. Yes, that prevails at Aztec and at other stations where more than 70 cars were shown, say, in the neighborhood of 100 to 125 cars, as, for instance, at Sentinel, there was a yard at Ivalon, the third station from the top on the lefthand side. There are and probably were several tracks at Casa Grande, Red Rock, and then passing over to the Rio Grande division, with which territory I am more familiar than the territory west of Tucson.

Q. You speak of the Rio Grande division as it existed as one time to Tucson?

[fol. 3154] A. That is right. There are and were two tracks at Vail, Pantano, Mescal, Dragoon, Cochise, Willcox, and San Simon.

Q. What about Raso, is that a single siding?

A. I skipped that because I am not sure whether there is one long siding or two there.

Q. Is this district east of Tucson part of the district which you had under your jurisdiction as assistant engineer of the Rio Grande division?

A. I worked on the Rio Grande division in this particular territory for eight years. This was part of the territory I worked in for eight years.

Q. Have you a statement before you in one sheet, Mr. Sines, entitled, "Main Line Freight Trains of Various Lengths Operated between Yuma, Arizona, and El Paso, Texas, Via Gila, Arizona, and Lordsburg, New Mexico, and Via Douglas, Arizona, over South Line during June and August, 1938, Actual Operations Compared with Redispatched"?

A. I have.

Mr. Mason: May we have this statement marked exhibit No. 214?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 214 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 214, Mr. Sines?

[fol. 3155]? A. It was prepared under my direction and supervision and I have checked it.

Q. What was the source from which it was prepared?

A. The actual train sheets for the months of June and August, 1938, for the information shown on the lefthand side of the sheet under the caption "Actual" and the redispatch sheets for the months of June and August, 1938, for that portion of the sheet under the caption "Redispatch."

Q. Did you also use the white work sheets A concerning which you have testified?

A. Yes, we worked a two-way check on this exhibit by means of the white work sheets A because they also show train lengths.

Q. When you say "we," you mean yourself and your assistants?

A. Yes, the rest of the train limit party that did the statistical work.

Q. Has the exhibit been compared and checked against these underlying sources?

A. It has.

Q. Are these the same actual and redispatch sheets which have been furnished previously to Mr. Strouss?

[fol. 3156] A. Yes.

Q. And the white work sheets A, have they been furnished to him?

A. They have.

Q. Referring to the actual column here, the exhibit purports to show a grouping of trains according to their length in cars in columns A, B, and C. What train length, or, rather, at what point in the course of the progress of the train across the division is the train taken for the purpose of determining into which classification it falls?

A. This classification is according to the highest number of cars handled at any one time.

Q. I take it if a train had 49 or less cars at any one time it would fall into the classification in column A?

A. Yes, fifty and less.

Q. Is the count taken by examining the story of the train as it is written on the train sheets?

A. Yes.

Q. There are certain computations showing totals and percentages. Are those capable of being made and checked from the face of the sheet itself?

A. That is right. We have used a system of cross-addition and footings so that the computations are auto-
[fol. 3157] matically checked by arriving at the same total at the lower righthand side of the block in each instance.

Q. Will you explain how that is? Do you, for example, in connection with the actual between Yuma and El Paso show a certain total number of trains in column J opposite the words, "Grand Total"?

A. That is right.

Q. Is that total capable of being checked by the subtotals above?

A. That is right.

Q. And also by the column totals to the left?

A. That is right.

Q. And the same would apply to the totals shown in column T?

A. Yes, sir.

Q. Taking everything that appears in the subtotal footings above or the columns to the left as far as the double line?

A. That is right.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: This is a summarization or recapitulation of the information appearing on exhibit No. 198 and other
[fol. 3158] white sheets similar to that covering the redispatch during the two periods and on the territory indicated?

A. That is right, with this additional explanation, that in all cases you will not be able to check the length of the trains off the white sheets because in a few cases the train reached its maximum length between initial terminal and final terminal and exhibit No. 198 simply shows the length of the train leaving the terminal and arriving at the terminal.

Mr. Strouss: That is true of the other white sheets of which this is typical?

A. Yes.

Mr. Mason:

Q. Then it is necessary in this connection to go to the dispatchers' train sheets for a complete check, is it?

A. Yes.

Mr. Strouss: You meant of the actual trains?

A. Of the actual trains for those on the left-hand side of the sheet and the redispatch on the righthand side.

Mr. Strouss: In other words, you would have to go to the train sheets for the redispatch in order to get that information as to redispatched trains?

A. That is right.

[fol. 3159] Mr. Mason:

Q. I take it that arises because some few of these trains may have picked up cars after leaving initial terminal and dropped them before arriving at final terminal?

A. That is right; not many trains do that, but a few.

Q. Is there any previous exhibit showing a train count according to maximum train length to which this exhibit corresponds?

A. I made one for the territory from Sparks to Ogden.

Q. Do you have in mind exhibit No. 186?

A. Yes.

[fol. 3160] Q. Is the train count undertaken here along the same lines and following the same classifications?

A. That is right.

Q. Now, I take it that the results of the entire showing are as indicated by the recapitulation at the foot where you compare actual operations with redispatched operations?

A. You have to do that in two parts. The recapitulations appear for the line Yuma to El Paso via Gila and Bowie

In the upper part of the sheet, and in the lower part of the sheet the recapitulations afford a comparison for the line Tucson to El Paso via Douglas.

Q. This doesn't relate in any respect to the Phoenix line, does it?

A. No, and on this exhibit I didn't attempt to throw the south line operation in with the north line operation to get a grand total.

Q. The Tucson-El Paso via Douglas is entirely separate from the upper part of the sheet so far as totals are concerned?

A. That is right. The reason for that was that the south line operation was affected relatively very little by the redispatch study. We ran the same number of trains in [fol. 3161] the actual as will be observed by reading the last figure in column J as we did on the redispatch, as will be shown by reading the last figure in column T.

Mr. Strouss: Why wasn't the Phoenix line shown?

A. Well, during June and August, it didn't offer any opportunity for redispatching or consolidating of trains, you might say, whatsoever.

The Court: In other words, Mr. Sines, on that particular line, even if the Arizona Train Limit law had not been in force and effect, you would not have been operating any trains over 70 cars in length?

A. It didn't appear so, for the months of June and August, 1938. You note we did make the redispatching study for December, 1938, where we showed quite a change.

Mr. Mason: Have you a subsequent exhibit to cover that?

A. That is right, that is another study that was listed on one of my——

Q. It is listed on Exhibit 197, I think, or 196.

The Court: Mr. Sines, in connection with actual operations, under Exhibit No. 214, it would indicate that the defendant here had studiously lived up to the Arizona [fol. 3162] Train Limit law during those two periods?

A. Yes, sir.

Q. There were two instances where the train had to be broken down at the state line in order to comply, or I should say four instances?

A. That is right, but let me make this clear. It was not necessarily at the state line, it was somewhere east of the state line. We had a record of the trains leaving Lordsburg and for the purposes of this exhibit we did not attempt to show just where those cars had been set out before the trains reached the state line.

Mr. Strouss: Or whether they were destined to the point where they were set out?

A. No, we didn't determine that either.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 214.

Mr. Strouss: We make the same objection to this exhibit as was made to Exhibit 198, particularly to the part of this exhibit covering the redispatch.

The Court: Well, the Court is going to overrule the objection, and admit it in evidence.

(Thereupon the document referred to was received in [fol. 3163] evidence and marked "Defendant's Exhibit No. 214.")

Mr. Mason: Mr. Sines, in your discussion prior to the offer of the exhibit, you said that you operated the same number of trains over the El Paso-Douglas-Tucson line in the redispatch study as were operated in actual operations?

A. Yes.

Q. But, apparently, according to the exhibit, the train lengths were considerably changed in redispatching?

A. That is right. Whereas actually only two trains exceeded 70 cars, our redispatch shows that 51 trains would have exceeded the 70-car limit, or 17.23 per cent.

Q. How did you reach this result of operating 49 more trains with more than 70 cars? Did you operate more traffic over the south line?

A. That is right, we took empty cars off the north line and ran them through Douglas. With one train a day in each direction between Tucson and Douglas, and between Douglas and El Paso, there was still available on the redispatching study, and it was true in actual operations too, although we didn't have an opportunity to avail ourselves of it, there was still available additional engine capacity to haul more tonnage, so we took the empty cars, [fol. 3164] some of the empty cars off the north line, thereby

lightening the burden on the north line and sent them down through Douglas without increasing the train-miles or the train-mile expense doing it, except to the extent that you might burn a little bit more fuel because of the increased distance.

Q. Was this movement of empties predominantly westbound, particularly in June, over the south line?

A. Yes, that is shown in the Tucson-Douglas block, where on the redispatch westbound we operated sixteen trains of over 70 cars.

Q. And the same number between Douglas and El Paso apparently?

A. That is right.

Q. Were you present in the court room, Mr. Sines, when the dispatchers spoke of the unbalance of trains and consequently of locomotives at intermediate points, such as Gila and Lordsburg?

A. Yes.

Q. Does your exhibit indicate from the record of the actual operation, an overbalance in one direction or another of trains between Yuma, and Gila, for example?

A. It does.

[fol. 3165] Q. Will you point to the figures?

A. In the first block, Yuma to Gila, the total in column J indicates 228 trains east and 251 trains west.

Q. What happened to that unbalance of 23 trains in the month of June, 1938, on the redispatch?

A. On the redispatch we were able to redistribute the business so that there were 165 trains east and 164 trains west.

Q. Are similar figures available for each of the other blocks to indicate an unbalance in actual operation, and a partial balancing or approximate balancing in redispatching?

A. That is right, and that is true. As far as Lordsburg, from Lordsburg to El Paso it appears that a balance of 216 east and 219 west, and actual between 182 east and 189 west, an excess of three became an excess of seven. Just why that was, I don't recall.

Q. Now, referring again to the first block of the exhibit, the June movement between Yuma and Gila, the 228 trains eastward, and 251 trains westward, Mr. Sines, what was done to provide locomotives and crews for the other 23 trains?

A. Locomotives were double-headed, and train crews were deadheaded in the opposite direction to provide loco-
[fol. 3166] motives and crews to handle the excess cars.

Q. Does that mean, then, that you would have to move 23 locomotives approximately from Yuma to Gila without load?

A. Yes, sir.

Q. And 23 train crews deadheading?

A. That is right.

Q. But performing no service?

A. That is right.

Q. Would the same or substantially the same result be true as to each of the other cases in column J, where an unbalance is shown?

A. Yes.

Q. Again referring to the block between Yuma and Gila, and the same appears to be the case as to the block between Gila and Tucson, and Tucson and Lordsburg in the redispatching study, Mr. Sines, I notice that your eastward trains did not in any instance exceed 120 cars, and that the greater number of them fell in the block between 91 and 100 cars, whereas your westward trains in June, of course, fell in large number in the block between 121 and 130 cars. What is the explanation for the different preponderance of train lengths eastward and westward be-
[fol. 3167] tween Yuma and Gila during June when the actual number of the redispatched trains was almost the same?

A. There was an excess of westbound empties in June. In other words, we had more empty cars moving westbound than there were loaded cars moving eastbound, and not having any restriction placed on the maximum number of cars we could handle, we took care of this excess empty westbound movement by putting more cars in the westbound trains than in the eastbound.

Q. Do I understand that these are only empties moving westbound, or does that include loads as well as empties?

A. It also includes loads.

Q. Your unbalance is as between cars both loaded and empty in one direction over the other?

A. Yes, that is right. I spoke of the excess empties westbound because it is the empty cars that show the greatest amount of fluctuation.

Q. It is the empty movement that contributes largely to the unbalance?

A. That is right.

Q. And referring to these other blocks, Gila-Tucson and Tucson-Lordsburg, and Lordsburg-El Paso, would the same explanation apply?

A. Yes.

[fol. 3168] Q. Have you any other feature of the exhibit that has not been mentioned?

A. Yes. In the territory Lordsburg to El Paso, we see evidences of the efforts of Chief Dispatcher Herrell to make two trains out of three trains at Lordsburg in the eastward operation, and, also, it is apparent that there has been splitting up of long trains at Lordsburg in westward operation. He had for the two months shown, June and August, 14 plus 15 plus 156 plus 23, or 208 of the 678 trains over seventy cars. There is a comparison that you spoke about before the exhibit was introduced, between 186 and Exhibit 214, and the quickest comparison is to be made in the percentage of trains over 70 cars. Between Sparks, Nevada, and Carlin, Nevada, we had 72.4 trains over 70 cars, between Carlin, Nevada and the Nevada-Utah line we had 88.41 trains over 70 cars, and between the Nevada-Utah line and Ogden, Utah, we had 85.86 trains over 70 cars. On our redispatching study for the months of June and August, 1938, we had 80.06 trains over 70 cars for the line Yuma to El Paso, expressed in percentages.

Q. Mr. Sines, will you refer to a chart in one sheet bearing a rather long title, "Relative Train Length, California, [fol. 3169] Arizona, New Mexico, Texas, Through and Local Freight Trains," and so forth, based on redispatching study of June and August, 1938?

A. Yes.

Q. Did you prepare this exhibit or cause it to be prepared?

A. I had it prepared.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 215 for identification"?

The Clerk: Defendant's Exhibit No. 215 for identification.

Mr. Mason: From what sources was this prepared?

A. This was prepared from the actual and redispatch train sheets for the months of June and August, 1938.

Q. Now, as to the district west of Yuma, did you use those sources?

A. No, that information was taken from a statement furnished by the auditor of equipment service accounts.

Q. How was the information prepared?

A. The territories included there are the freight runs between Indio and Yuma and between the Imperial Valley and Yuma, so that the average number of cars per train [fol. 3170] is the average of the trains entering Yuma from the west and departing from Yuma to the west.

Q. Is this average a composite average of trains over both those lines which converge just west of Yuma?

A. Yes.

Q. Is it based upon the conductor's wheel reports?

A. It is, and it is determined by compiling the car-miles and then dividing by the train-miles to get the average number of cars per train-mile.

Q. This figure west of Yuma represents the number of cars per train from the aspect of the trains arriving at Yuma from the west, from as far west as Indio or the Imperial Valley?

A. Yes, sir.

Q. What do the averages for the lines styled "Actual Operation" represent as shown here?

A. They represent the average length of trains arriving at the terminals indicated for the territory Yuma to Gila, for instance, in an eastward direction, at the bottom of the sheet, the trains arriving at Gila in actual operation averaged 64.3 cars; whereas, the trains arriving at Gila on the redispatched operation——

Q. The exhibit has not been offered. But these aver- [fol. 3171] ages are the average number of cars in the train, exclusive of caboose, is that correct?

A. Yes, this is exclusive of caboose.

Q. Entering the particular terminal indicated by the vertical line; is that correct?

A. That is correct.

Q. And all of the information as to the districts east of Yuma is taken from the actual and redispatch train sheets and the white work sheets A?

A. Yes.

Q. Has the exhibit been checked against the underlying sources?

A. It has.

Q. And as to the records shown in compiling the average west of Yuma, are those records available?

A. I have the statements furnished by the auditor of equipment service accounts, and I can get the conductors' wheel reports for that territory, if they should be required.

Mr. Mason: Will you need that, Mr. Strouss, for the territory west of Yuma?

Mr. Strouss: The conductors' wheel reports? No. West of where?

The Witness: Yuma.

[fol. 3172] Mr. Mason: The California portion of the sheet.

Mr. Strouss: No.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No, I have no questions.

Mr. Mason: I don't think you have explained, Mr. Sines, but do I understand that the top half of the chart above the line across the exhibit, which is designated by the zero, represents the average length, actual or redispatched, as the case may be, of westward trains?

A. That is right.

Q. Is that entirely separate from the showing on the lower half of the chart representing the lengths of the eastward trains?

A. That is right.

Q. What is the purpose or significance of the cross-hatching?

A. By means of the area that is cross-hatched on this chart, we have visual evidence of the effect of the Arizona Train Limit law in limiting the length of freight trains.

Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 215.

Mr. Strouss: The same objection as to the previous ex-[fol. 3173] hibit.

The Court: The objection is overruled. It may be admitted in evidence.

(Thereupon the document referred to was received in evidence and marked, "Defendant's Exhibit No. 215.")

Mr. Mason: Now, Mr. Sines, do I understand from the exhibit that the average length of trains entering Lords-

burg, rather entering El Paso from the west over the Lordsburg-El Paso line, is at present 68 cars?

A. Yes.

Q. And that the average length westward entering Lordsburg is 65.2 cars?

A. That is right.

Q. I notice also that you show in actual operation between Yuma and Lordsburg average lengths of 63, 64, and 65 cars, approximately, in the various districts?

A. Yes, sir.

Q. Although the law permits 70 cars. Will you explain why the average as computed by you in actual operation does not attain more closely to 70 cars?

A. There are two reasons, there are two very important reasons. The first one is that it is not always possible to [fol. 3174] put 70 cars in every train, the traffic simply isn't there. That is particularly true with the last train leaving Yuma at the end of the day's business, at the end of the day's business as it is received from California, and furthermore,——

Q. Mr. Sines, you say that the number of cars in the day's business at Yuma will not be an exact multiple of 70, is that the idea?

A. That is the idea.

Q. Why can't you leave those 40 or 50 cars which may be the odd cars and wait until you have an exact multiple of 70?

A. Because those cars with perishables in them are moving on schedule and are due in Chicago or some other eastern destination on a certain day, and cannot be left over at Yuma for any length of time. The local trains also have difficulty, probably very seldom, if ever, reach 70 cars in length. Those are the trains that pick up and set out and do local work along the road. We don't have any assigned locals in this territory, but occasionally trains will run each day doing more local work than others; a train leaving Yuma, knowing that he is going to pick up cars at Wellton, will leave Yuma with enough space under seventy [fol. 3175] to permit him to pick up to 70 cars at Wellton, then if he sets out some cars short of Gila he will have to run into Gila with a consist of less than 70 cars. The result of that operation is that the average length of the train for the entire run from Yuma to Gila may be considerably

less than 70 cars. This applies, of course, to all districts between Yuma and Lordsburg, and Yuma to Rodeo. The other important factor is the length of sidings as they exist today in Arizona. Originally, as shown by the exhibit which I have just introduced, Exhibit 213, we had a complement of sidings which were capable of, with few exceptions, of holding trains consisting of 70 cars and engine and caboose, but the engines and the cars got longer and the result is that today we cannot crowd 70 cars into all of these sidings. On the other hand that does not limit us necessarily to operating only 66 cars in both directions, we can still operate up to 70 cars in one direction on trains and run short siding clearance length trains in the other direction to permit these trains to pass. Another consideration is that it is not always necessary that all of the trains in the same direction be of 70 cars. By timing the departures from terminals, it is possible to run trains of [fol. 3176] up to 70 cars in each direction within the same twenty-four hour period. This can be done also by taking advantage of the few long sidings which we do have today in Arizona. The result of all of this is that instead of having an average more closely approaching seventy cars, we get down to the averages shown on my exhibit 215, but when it comes to seventy cars, the Southern Pacific Company has never felt justified in spending the hundreds of thousands of dollars that would be necessary to give them a complete line all the way across Arizona of sidings which would be capable of holding more than seventy cars.

The Court: This hearing will be recessed until tomorrow morning at ten o'clock.

(Thereupon the court stood at recess until January 29, 1941, at ten o'clock, A.M.)

[fol. 3177] January 29, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

Mr. Mason: Your Honor, Mr. Masson is here and has some further additional information in the shape of exhibits which were suggested at the time of his prior appearance, and if there is no objection I would like to inter-

rupt the course of Mr. Sines' testimony to put Mr. Masson on for that purpose and for any additional questions which Mr. Strouss may have.

The Court: If there is no objection, that may be done.

L. J. Masson was recalled to the stand and testified further as follows:

Redirect examination.

By Mr. Mason:

Q. Mr. Masson, at page 2317 of the transcript, with reference to Exhibit 166, it was suggested by Mr. Strouss that you give more of the detail of the cars and tonnage for the System and for the three states, Arizona, New Mexico and Nevada, in accordance with the major sub- [fol. 3178] divisions which the commissions recognize in the annual reports rendered to them. I will ask you now if you have prepared from the annual report of the company to the Interstate Commerce Commission for the year ended December 31, 1939, a showing of schedule 541, revenue freight carried during the year, showing the total of tons and cars by commodities and by classifications of commodities?

A. Yes. This exhibit is a photostatic copy of schedule 541 as it appears in the annual report to the Commission, except as to the heading, "Southern Pacific Company, Pacific Lines," and the legend which appears at the upper righthand corner.

Q. This is an exhibit of four sheets, the first sheet showing a photographic reproduction of printing "541. Revenue Freight Carried During the Year."

A. Yes, sir.

Mr. Mason: May we have this exhibit marked No. 216?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 216 for identification.

Mr. Mason: Now, is Exhibit 216 an exact photographic reproduction of these particular pages of the annual re- [fol. 3179] port which are identified by number from 512 to 519?

A. Yes, except as I have stated.

Q. The identifying material at the top of the sheet has been added by typewriting before photographing?

A. Yes.

A. And being a photograph, it is an exact reproduction except as to size?

A. Yes.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: We offer it as defendant's Exhibit No. 216.

Mr. Strouss: No objection.

The Court: It may be admitted.

(Thereupon, the document referred to was received in evidence and marked "Defendant's Exhibit No. 216.")

Mr. Mason: In connection with the same subject matter, Mr. Masson, have you an exhibit in two sheets bearing the style in typewriting, "Southern Pacific Company, Pacific Lines, State of Arizona," and then showing on the first sheet schedule 941, revenue freight carried during the year?

[fol. 3180] A. Yes.

Mr. Mason: May we have this exhibit marked No. 217?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 217 for identification.

Mr. Mason: Is this exhibit a photograph of pages 908, 909, 910, and 911 of the annual report for the year 1939, rendered to the Corporation Commission of the State of Arizona?

A. This is a typed transcript of the figures as they appear in the report to the Corporation Commission of Arizona on a form that corresponds to Schedule 941, which was subsequently photostated.

Q. Then these figures appearing here in typewriting, apart from the printed matter which appears in the photostat, are a typewritten transcript of figures rendered to that commission?

A. Yes.

Q. Why did you prepare this in typewriting?

A. Because our office copies are in manuscript.

Q. Has this exhibit been checked against the office copy of the annual report?

A. Yes.

Q. Will you state whether it is true and correct?

[fol. 3181] A. To the best of my knowledge and belief it is, yes, sir.

Q. Do I understand that this contains the information for the State of Arizona corresponding substantially to the information for the System as reported to the Interstate Commerce Commission, and shown on Exhibit 216?

A. Yes, sir.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: We offer the exhibit as defendant's Exhibit No. 217.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 217.")

[fol. 3182] Mr. Mason:

Q. Mr. Masson, have you prepared an exhibit similar to No. 217 from the annual report rendered to the state commission of New Mexico for the year 1939?

A. Yes, sir.

Q. Was this exhibit prepared in the same way?

A. It was prepared in the same way, the figures that appear in the schedule of the report to the state corporation of the state of New Mexico for the year 1939.

Mr. Mason: May we have this statement marked No. 218 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 218 for identification.

Mr. Mason:

Q. I take it that exhibit No. 218 is in exactly the same form as exhibit No. 217 but relates to the state of New Mexico?

A. That is true.

Q. Has it been compared?

A. Yes, sir, and it is correct to the best of my knowledge and belief.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 218.

Mr. Strouss: No objection.

The Court: It may be admitted.

[fol. 3183] (The document referred to was received in evidence and marked "Defendant's Exhibit No. 218.")

Mr. Mason:

Q. Have you a similar exhibit in two sheets relating to the state of Nevada and purporting to be a reproduction of pages 908 to 911, inclusive, of the annual report to the Nevada Public Service Commission?

A. Yes, sir.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 219"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 219 for identification.

Mr. Mason:

Q. Was exhibit No. 219 for identification prepared in the same way as the preceding exhibits Nos. 217 and 218?

A. Yes, sir.

Q. Has it been compared?

A. Yes, sir, and it is correct to the best of my knowledge and belief.

Q. It relates to the same subject matter but as set forth in the report to the Nevada Commission?

A. As set forth in the report to the Public Service Commission of Nevada for the year 1939.

Q. Are these forms of reports as rendered to the states [fol. 3184] insofar as concern schedule 941 identical or substantially so?

A. Yes, they are identical.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 219.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 219.")

Mr. Mason:

Q. Mr. Masson, in connection with your exhibit No. 173, at page 2290 of the transcript, you stated as to item 18 there were no amortization charges included in the item. I will ask you if you have made a subsequent investigation to determine whether any such charges have been included in that item for any of the years represented on exhibit No. 173?

A. At the time of my answer I had before me the figures for 1939, in which year there were no amortization charges, but I overlooked the fact that there are charges for amortization of discount on funded debt in all of the years 1925 to 1938, inclusive.

[fol. 3185] Mr. Mason: May we have the understanding that the statement in the record at page 2290 may be considered corrected accordingly?

Mr. Strouss: Yes.

The Court: It is so ordered.

Mr. Mason:

Q. There was one other matter to which inquiry was made in connection with your exhibit No. 162. You were asked to give some breakdown of the mileage, I believe?

A. Mr. Strouss asked for a breakdown of the mileage for 1939, as I recall it, as between main line and branches on exhibit No. 162. That breakdown is as follows: main line, 5,129 miles; branch lines, 3,430 miles, which comes to the total of 8,559 miles as shown in the exhibit. That, I believe, completes all of the data you asked for.

Mr. Strouss: Yes, I believe so.

Mr. Mason: Have you any questions of Mr. Masson?

Mr. Strouss: No, I have nothing further to ask him.

Mr. Mason: Do you wish Mr. Masson to return at a later date for cross-examination?

Mr. Strouss: I don't believe so. I have gone over his testimony and I don't know of anything I wish to ask him about further.

[fol. 3186] Mr. Mason: Unless you find something, we will consider Mr. Masson is excused?

Mr. Strouss: Yes.

The Court: You may step aside.

(Witness excused.)

B. S. Sines resumed the witness stand for further

Direct examination.

By Mr. Mason:

Q. Mr. Sines, have you before you an exhibit consisting of a chart of a single sheet entitled, "Southern Pacific Company, Yuma, Arizona, to El Paso, Texas, June 18th, 1938, Train Movements"?

A. I have.

Mr. Mason: Your Honor, we ask that this chart be marked "Defendant's Exhibit No. 220" for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 220 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 220 for identification or supervise its preparation?

A. It was prepared under my direction and I supervised it.

[fol. 3187] Q. The chart appears to be divided into two portions and I will ask you if the two are separate and distinct charts?

A. They are.

Q. Addressing yourself to the chart at the left side of the sheet which is headed "Actual," from what source was that prepared?

A. That was prepared from the actual train sheets reflecting the movement of trains on June 18, 1938, between Yuma, Arizona, and El Paso, Texas.

Q. Were the conductors' time returns and delay reports used in connection with the preparation of the chart?

A. They were.

Q. Is the showing on the chart headed "Actual" restricted to a particular route between Yuma and El Paso?

A. Yes, to the route via Gila and Bowie.

Q. From what source was the portion of the chart headed "Redispatched" prepared?

A. From the redispatched train sheets for the same date.

Q. Were the conductors' delay reports employed in connection with its preparation?

A. Only indirectly insofar as the conductors' delay reports were used to govern the movement of the redispatched [fol. 3188] trains, as I have previously described.

Q. The date referred to is June 18, 1938. Has that date any particular significance?

A. That is the day of maximum traffic during the month of June, 1938, between Yuma and El Paso.

Q. You mean maximum traffic with respect to train movement?

A. With respect to the number of trains operated.

Q. Would that also be the maximum number of cars moved between the points?

A. That would be a fair guess, although I didn't check the cars handled.

Q. Was that also the day on which the largest number of redispatched trains were operated or did you check as to that?

A. No, the check refers to the movement that occurred actually on June 18th.

Q. Going to the detail of the charts themselves, and referring for this purpose to the actual chart, I take it that the two charts are in a sense counterparts of each other?

A. They are; they are made out to the same time and distance scales.

Q. What is the significance of the figures under the word [fol. 3189] "Actual" and immediately at the top of the actual chart?

A. They represent the twenty-four hours of the day, June 18th, starting with twelve midnight and ending with twelve midnight.

Q. Are the hours plotted to scale horizontally across the chart?

A. They are.

Q. That is to say, the width of the chart is divided into twenty-four equal spaces?

A. Twenty-four equal spaces, yes.

Q. Those are the hours as designated by the figures A.M. and P.M., I take it?

A. Right.

Q. Proceeding down the chart and without reference first of all to the angling lines, what do the horizontal lines along the chart indicate?

A. They represent the station locations according to the names indicated at the left and right-hand sides of the chart.

[fol. 3190] Q. Are the distances between stations according to scale?

A. Yes, according to the miles between the stations.

Q. It appears, for example, that between Granite Spur and Ligurta is a considerably less space than between Ligurta and Wellton. Is that in accordance with the mileage between those points?

A. It is.

Q. Now, you show certain points or certain lines on the chart somewhat heavier than others. For example, I notice a heavy line at Gila and also a larger size of lettering used in designating Gila. Was there any particular reason for that?

A. Yes, we indicated the terminals with a heavier line and with larger sized printing.

Q. Then that particular designation applies also to Tucson, and Lordsburg, does it?

A. That is right.

Q. What is the significance of the cross-hatching that appears for example, between Yuma and East Yard, between Dome and Wellton, and between Stockham and Mescal?

A. The cross-hatching indicates the location of double track.

[fol. 3191] Q. Where there is no cross-hatching, what is the character of the operation?

A. Single track.

Q. I notice that in the double-track territory, between Stockham and Mescal, that the names of the stations on the lefthand side of the chart are not in all cases the same as the names of stations on the righthand side of the chart. Why is that?

A. That is because the location of the stations on the two tracks do not always coincide in the mileage distances from some given point, and is brought about because of the divergence of the tracks.

Q. Is that the district between Tucson and Mescal where the eastward and westward tracks are not on the same grade at all points?

A. Yes, and as I recall the distance, by the eastbound track is a mile or two longer than by the westbound track.

That difference in mileage is accounted for by shrinking or expanding the westbound track each time to conform to the eastbound mileage schedule. It would be impossible to draw the map, to draw this chart, and have exact scales in each direction, so we assumed that the eastbound scale is the governing scale.

Q. Does that have any substantial effect upon the chart [fol. 3192] itself?

A. It has very little effect; well, none at all on the information that the chart portrays.

Q. Now, what is the significance of the black lines which move across the chart, extend across the chart in a more or less diagonal fashion?

A. Those lines represent the progress of individual trains according to the time and distance scales upon which the charts are laid out.

Q. And are those trains identified in any manner on the charts?

A. Yes; those trains are identified with sufficient frequency so that a train may be traced from its first appearance on the chart to its final appearance on the chart.

Q. I notice that some of these lines sloping from the left to the right as one goes down the chart; that, practically all of them cross other lines from the left to the right as one goes up the chart. What do those intersections indicate?

A. If those intersections occur on single track, it means that the trains have met and passed in opposite directions.

Q. Do you indicate the meets by some particular method on the chart?

A. Yes, we drew circles around those meets in order the [fol. 3193] more easily to identify and count them.

Q. Now, if the lines intersect in a double track section, what does that mean?

A. Well, that means that the trains met, but that there was no interference between the trains, being on double track.

Q. They simply went by each other on opposite tracks?

A. Yes.

Q. I notice, also, that a sloped line changes its course frequently, that these sloping lines may come to the line indicating a station and then there will be a bend or elbow in the line?

A. Yes.

Q. The line, that is to say, extends to the right along the station line instead of continuing its course. What does that indicate?

A. It indicates that the train has stopped at that station for one reason or another, and the length of the elbow measured on the time scale indicates the length of time that the train was at the station.

Q. It appears that some of these circles which you have stated indicated meets have figures such as a 2 or 3 opposite them. What do those indicate?

A. When figures occur alongside of the circles it indicates [fol. 3194] the number of meets that have occurred between trains, for instance, a train in one direction may go into the siding and be passed by two trains running in the opposite direction. In that event we counted that as two meets, and the figure "2" alongside is also to assist in identifying and counting the meets.

Q. Now, some of these lines which you state indicated progress of trains are solid and others are dashed. What is the significance of that?

A. The long dash indicates passenger trains running on this particular day.

Q. Are they identified by their numbers?

A. They are.

Q. And what do the dotted lines indicate?

A. The dotted lines indicate movement of helpers and light engines without trains.

Q. Now, lines which start on the lefthand side of the chart and slope to the right and downward indicate movement in what direction?

A. Eastward, generally from Yuma toward El Paso.

Q. How do you indicate westward movement?

A. By a line beginning at the lower left and progressing toward the upper right.

Q. Suppose that a train at midnight is at or near an [fol. 3195] intermediate station between Yuma and El Paso such as Gila, for example, how do you indicate that? Where does its line start?

A. If it be the midnight between June 17th and 18th, the line will start at that station and the further progress of the train will then be indicated by the manner in which the line is drawn. If it be the midnight between June 18th and 19th, the train is shown passing off of the chart at the

particular location, or near the particular location that it happened to be at midnight.

Q. Now, has this exhibit been checked against the dispatchers' train sheets and the time returns and daily reports?

A. Several times.

Q. Was the chart showing the movement of redispatched trains prepared in the same way and along the same lines as the chart depicting actual movements?

A. Yes, sir.

Q. The description which you have given of the chart as to actual applies likewise to the redispatched?

A. That is right.

Q. Now, I notice at the foot of the sheet there is a tabula- [fol. 3196] tion as well as a legend. Where do you get those figures?

A. Those figures can be checked by making a count of the particular items indicated directly above.

Q. That is, you can count the number of actual trains by just counting the number of lines eastward or westward, can you?

A. Yes.

Q. The same way as to the redispatch?

A. Yes.

Q. And you can find the number of meets by taking the number of circles and figures of meets shown on the chart and adding them up?

A. That is right. That explanation is true as to meets and passes, but a further explanation should be made with respect to the count for the number of trains. In making that count, we found it was necessary to establish an arbitrary rule and we counted those trains which left any terminal within the 24-hour period. Fractional trains that started at midnight at some intermediate station, we did not count.

Q. Unless they left a terminal during the twenty-four hours?

A. That is right.

[fol. 3197] Q. Then a train which came on the chart, let us say, at Wellton at or near midnight and went only to Yuma before going off the chart, would not be counted as a train?

A. No.

Q. But if it left Gila at or near midnight and went on to Yuma, it would be counted?

A. Yes.

Q. And the same way, if a train came on the chart moving eastward at a point between Lordsburg and El Paso, it wouldn't be counted as a train because it didn't leave Lordsburg within the 24 hours?

A. That is right.

Q. I notice that some of these circles, according to the legend at the foot of the chart, instead of being in solid line are in dashed line.

A. Yes.

Q. What does that signify?

A. That signifies a pass.

Q. How do you define a pass as distinguished from a meet?

A. A pass occurs when a train overtakes a train going in the same direction and passes it, goes by the preceding train.

Q. Does that happen, for example, when a passenger [fol. 3198] train overtakes a freight train in the same direction on single track and runs around the freight train?

A. That is right. That can happen on both single and double track.

Q. Meets normally occur only in single-track territory?

A. Yes, sir.

Q. Whereas, passes may occur in either?

A. Both single and double line track.

The Court: Mr. Sines, referring to that exhibit under the actual operations, see if I follow the chart: take for instance the progress of the train designated C-4-13 in the upper lefthand corner. Now, that train left Yuma near midnight of June 17th-18th, and proceeded on its eastward course, but only reached during that 24-hour period the division point at Lordsburg, when we lose track of it; is that correct?

A. That is correct, although apparently that is C-413 leaving Lordsburg at approximately 11:30 and passing off the chart between Elmoris and Lisbon. You will notice that the preceding train leaving Lordsburg is CY412 and west of Lordsburg the preceding train was also CY412.

The Court: Now, taking a passenger train, for instance [fol. 3199] No. 6, that left Yuma between four and five

A. M., it reached El Paso, Texas, at eight P. M. that evening?

A. That is right.

Mr. Mason: What is the purpose of the charts shown here, on Exhibit 220 for identification?

A. There are two primary purposes. The first is to give visual evidence of the difference in operation between operations under the 70-car limit, the actual, and under unrestricted operation, the redispatch. Just by a glance of the eye it is possible to obtain an appreciation of the reduction in the number of trains possible with an unrestricted operation. The second purpose is to demonstrate the reduction in interference occurring as a result of the reduction in the number of trains operated. The second purpose is largely the reason for the tabulation appearing at the bottom of the sheet where the number of trains and the number of meets and passes establish a relationship which I develop later to make an estimate of what would occur during the year 1938 under an unrestricted operation.

Mr. Mason: Have you any questions on this exhibit, Mr. Strouss, at this time?

Mr. Strouss: No; not at this time.

[fol. 3200] Mr. Mason: Your Honor, there are certain other explanations that could be made with profit on the exhibit, but would involve some of its details. I prefer to ask them after the exhibit has been received in evidence, if it is received. I offer the exhibit in evidence as Defendant's Exhibit No. 220.

Mr. Strouss: The same objections to this exhibit as were made to Exhibits 198 and 214 and 215, particularly as to the redispatch part of the exhibit.

The Court: The objection is overruled. It may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 220.")

[fol. 3201] By Mr. Mason:

Q. Mr. Sines, I wish you would take some particular train on the exhibit and indicate its progress. Take, for example, C-413 in actual operation. That train apparently left Yuma somewhat before midnight of June 17th; you first see it at East Yard, is that correct?

A. That is right. That train probably left Yuma about eleven-thirty or sometime around eleven-thirty and, arriving at East Yard at the end of the double track, it met a westbound train DF-3627, meaning "dead freight with engine 3627." We counted that as a meet because inspection of the train sheet and conductor's delay report indicated that the progress of 413 had been delayed a little by the DF-3627 leaving the single track and going on the double track.

Q. Does that mean that C-413 waited at the end of double track for the other to clear?

A. Yes. 413 then progressed to Araby and went into the siding to meet passenger train 43; went to Fortuna and went into the siding to meet train No. 5. He then proceeded to Gael and the little jog to the right is an inspection stop. He then proceeded to Mohawk and went by dead freight 3625, which had gone into the siding at Mohawk. C-413 was not delayed by that meet. C-413 then proceeded [fol. 3202] to Stanwix where C-413 went into the siding and trains SSW First and Second 17 consolidated with GBW-16 passed, followed immediately by SSW Third 17. C-413 departed from Stanwix after SSW Third 17 had gone by and doubled from Lava to Sentinel. The double is indicated by the jog to the right and by the amount of time consumed by the train in going from Stanwix to Sentinel. At Sentinel he met DF-3321 which was waiting for him but which did not delay C-413 and then went to Tart on where he met DF-3612, again not being delayed by DF-3612. He had another meet with DF-3638 at Smurr. There was no delay to C-413 at Smurr either. Then approaching Gila the conductor's delay report showed that the train had flagged a block into Gila and that is the reason for the slow progress being indicated by the less steep slope of the line beginning halfway between Smurr and Gila.

Q. You say he flagged a block, what do you mean?

A. It means that approaching Gila yard he found the block signals at "Stop," and sent a flagman ahead to walk in advance of the engine and flag the train into the station at Gila.

Q. He had to wait, did he, before he could pass the block with the signal in "Stop" position?

[fol. 3203] A. Yes, the flagman has to go out there a safe distance ahead, I think it is something like half a mile or a mile that the flagman has to go out ahead of the train

in order to properly protect his train. C-413 arrived at Gila at approximately 6:15. He was in Gila about thirty-five minutes, departing at 6:50 and proceeded to Estrella. At Gila he picked up a helper, the helper being cut off at Estrella and returning to Gila. The return of the helper from Estrella to Gila is indicated by the short dashed line leaving Estrella almost immediately after the departure of train C-413. C-413 progressed to Mobile and went into the siding to permit passenger train No. 6 to pass him. He then went to Enid where DF-3660 was already in the siding, having met passenger train No. 6. C-413 went past Enid without delay and progressed to Maricopa where there is a stop indicated, that is a water stop as I remember, or he might have been there for switching. He then progressed to Casa Grande where he met DF-3636 without being delayed and progressed to Picacho where there was a delay for one reason or another which I don't remember. He went on to Rillito where he stopped again for five or ten minutes and then progressed to Cortaro where he met DF-3615 without being delayed inasmuch as DF-3615 had [fol. 3204] gone into the siding. He then progressed to Tucson, arriving at Tucson at approximately 12:35. As he was entering the Tucson yard and between the end of double track at Stockham and the yard at Tucson he met DF-3617 departing from Tucson. C-413 departed from Tucson at approximately 1:40—I want to explain that these times are approximate as I read them off this scale.

Q. They are actually shown, I take it, on the train sheets and the time returns and delay reports?

A. Yes, that is right. He went to Mescal without stopping. He stopped at Mescal probably for an inspection, went to Chaniso where he met DF-5021, DF-5021 having taken siding, and then C-413 went to Benson where he met two passenger trains, first 43 and second 43; C-413 taking the siding. Leaving Benson he went into the siding at Curvo for merchandise train 5026 and also took siding at Sibyl for SSW First 18 and GBW-17. Then he went to Dragoon and took siding for SSW Second 18 and apparently waited there also for DF-5037. There is no indication on this chart as having had a helper from Tucson to Dragoon, but I would say that he did have one because [fol. 3205] he had a helper between San Simon and Steins.

Q. If he had a helper, it is possible that the helper engine may have been attached as a double-header to one of the westward returning trains?

A. Yes, that would have occurred at Dragoon and the presence of the helper would not have been disclosed.

Q. Because it would not be a separate movement?

A. That is right.

Mr. Strouss: I think the testimony of what probably was there should be stricken.

The Court: Yes, it may be stricken.

By Mr. Mason:

Q. In any event, whether or not a helper was used will be revealed by the train sheets?

A. That is right.

Q. And the movement of the helper, if it was double-headed, is likewise indicated by the train sheets?

A. That is right. He progressed to Willcox where a delay of five or ten minutes is indicated and then went to Bowie where he was delayed ten minutes and also met DF-3742. At San Simon he stopped for a helper and went to Steins where the helper was cut off, the return of the helper being indicated by the short dashed line, and then [fol. 3206] progressed to Pyra where he met DF-5014 without being delayed and reached Lordsburg at approximately 10:45. He departed from Lordsburg about 11:35 and passes off the chart between Ulmoris and Lisbon at midnight.

Q. You point out in the progress of this train various places at which he took siding either for passenger trains or for freight trains. When a train goes into a siding to wait for a passenger train or another freight train which it is to meet or which is to pass it, who throws the switch which permits it to enter the siding?

A. The head brakeman of the train entering the siding.

Q. When the train pulls out of the station after the meet or pass has been accomplished, is the switch again lined up for the main line?

A. Yes, by the rear brakeman of the train leaving the siding.

Q. After a train has taken siding and while it is waiting, is the switch which it has used to enter that siding lined up for the main line?

A. Yes, the rear brakeman of the train taking siding does that also.

Q. When the train leaves the siding to return to the main [fol. 3207] line, does the head brakeman throw the switch for it?

A. That is right.

Q. Can these switches be thrown by these brakemen while they remain on the train or must they get off the train for that purpose?

A. They have to get off the trains to do that.

Q. Do they get off the trains while the trains are moving?

A. Yes.

Q. And climb on the trains again after the trains have started?

A. That is right.

Q. With reference to the actual chart again, I notice that some of these lines, for example, the line indicating the movement of train No. 901 at the top of the chart extends only from Wellton to Yuma. What does that indicate?

A. 901 is the Phoenix line local coming on to the Yuma-Gila line at Wellton and moving from Wellton into Yuma on the Yuma-Gila line.

Q. I notice that there are certain lines down toward the center of the chart which appear to begin at Picacho and extend only between Picacho and Tucson or from Picacho eastward. Is there a similar explanation in their case?

A. Yes, those are the trains operating between Tucson [fol. 3208] and Phoenix which use the line from Picacho into Tucson.

Q. For example, passenger train No. 2 apparently has no progress west of Picacho on the chart but is shown as extending from Picacho eastward?

A. That is right.

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

Mr. Mason:

Q. Mr. Sines, I will ask you whether the incidental delays which occurred to individual trains in actual operation are indicated on the diagram of the actual showing here,

for example, those due to flagging of blocks or engine failure or whatever may have happened?

A. That is right.

Q. Are those incidental delays indicated on the redispatched chart as having been assigned to a particular train or group of trains about the same time and in the same locality?

A. They are.

Q. That is the method pursued by you throughout the redispatch?

A. That is right.

Q. This is a sample of the method pursued throughout [fol. 3209] the redispatch?

A. Exactly.

Q. I take it also that, generally speaking, the freight trains operated on the redispatch side of the chart had more cars per train than those on the actual side?

A. That is right.

Q. And the length of those trains is shown by the underlying documents, the train sheets and the white work sheets A which have been furnished to Mr. Strouss and are now in his possession?

A. That is right.

Q. Is it possible from this chart to count the number of trains in the district, for example, between Yuma and Gila?

A. Yes.

Q. Have you made that count?

A. Yes, I have.

Q. How many trains are shown on the actual here as operated between Yuma and Gila in both directions during the twenty-four-hour period?

A. Counting them in the same manner that we counted them for the tabulation at the bottom, we have ten trains eastbound.

Q. Are you counting freight trains only?

A. No, I counted passenger trains also, thirteen trains [fol. 3210] westbound in the actual operation. I should make this observation, too. A moment ago I mentioned that we made an arbitrary rule to follow in counting these trains and I described how we confined that count to trains only leaving terminals between midnight and midnight. With respect to these trains that operated to Phoenix and which appear at Wellton and again at Picacho and which

operated through Douglas and which appear at Mescal and Anapra, we eliminated those trains also; so that we have in our count only those trains operated on the main line between Yuma and El Paso via Bowie and Gila and departing from terminals between midnight and midnight. The count that I just made between Yuma and Gila was made in that manner.

Q. And does not include the trains between Yuma and Wellton at all if they operated only that distance?

A. No.

Q. I take it that your total includes passenger trains as well as freight trains both on the exhibit itself and as stated by you for the Yuma-Gila district?

A. Yes.

Q. Counted in the same manner?

[fol. 3211] A. Yes.

Q. How many meets and passes were made in actual operation between Yuma and Gila?

A. In actual operation I make it forty-three meets and passes between Yuma but not including meets indicated at Gila.

Q. That is giving to each meet or pass its value as indicated by the adjoining figure or the value of one if no figure is shown?

A. Yes.

[fol. 3212] Q. Now, will you count the number of trains operated between Yuma and Gila as shown by the redispatch chart?

A. Eight trains eastward. Seven trains westward.

Q. And how many meets and passes between Yuma and Gila in redispatched operations?

A. Eighteen.

Q. Counted in the same manner?

A. Yes. I would like to check this at my leisure and would like to correct the record if I have made any errors.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss, before we pass to the next one?

Mr. Strouss: Not at this time.

Mr. Mason: Mr. Sines, I will ask you to refer to an exhibit in two sheets, entitled "Year 1938, Yuma, Arizona,

to El Paso, Texas, via Gila and Lordsburg, Estimated Number of Meets and Passes Eliminated by Long Train Operation."

A. Yes.

Mr. Mason: May this exhibit be marked Exhibit 221 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 221 for identifica-
[fol. 3213] tion.

Mr. Mason: Did you prepare Exhibit No. 221 for identification, Mr. Sines?

A. It was prepared under my direction and I have checked it, and it is correct.

Q. Now, from what sources did you take the information shown on the first sheet in the block headed "Actual?"

A. That is taken from the actual train sheets and the count of trains in columns A and B is made in the same manner as the count which I have previously described with Exhibit 220.

Q. And where do you get the figures in column D under the heading "Actual?"

A. That comes from the sheet 2 of this exhibit and are figures read off of the chart.

Q. Then, in order to get the showing on sheet 1, you first must go to the showing on sheet 2, is that correct?

A. Yes.

Q. Will you then explain what you have done on sheet 2?

A. Yes. The first thing we did was to make a count of trains and meets and passes in a manner exactly similar to that which I have just described in connection with Exhibit
[fol. 3214] 220 for the days indicated on the chart, those days being August 17, August first, June first, June second, June twenty-third, June fourteenth and June eighteenth, 1938. The number of trains operated those days are indicated at the top of sheet 2, and the number of meets and passes are shown alongside.

Q. Is this based upon the actual trains operated?

A. Yes, that count is from the actual train sheets in all instances, rather, that data is taken from the actual train sheet in all instances.

Q. Do I understand then you took the actual train sheet for the dates in 1938 which are indicated on sheet 2 and counted from the train sheets the number of trains in ac-

cordance with the method that you used and explained on Exhibit 220?

A. Yes.

Q. And also counted the number of meets and passes made by these trains in the district between Yuma and El Paso via Gila and Lordsburg?

A. Yes.

Q. And then plotted the points indicated by the dates to scale on this scale, is that correct?

A. That is right.

Q. Now, what does the figure at the top of sheet 2 "41" [fol. 3215] indicate? Is that the number of trains on August first?

A. That is August 17th, directly above the point August 17th.

Q. And that is plotted according to the scale at the foot of the sheet, is it?

A. Yes.

Q. Then what does the figure "74" indicate?

A. The number of meets and passes which occurred on August 17th.

Q. As represented by the actual train sheets?

A. Yes.

Q. That is plotted according to scale on the righthand side of the sheet?

A. That is right.

Q. Then, each of these other figures or pair of figures at the top of the sheet may be read down to its corresponding date, is that correct, to a plotted point?

A. That is right.

Q. Then, having plotted these points on a scale of this kind, what was the next step?

A. We then computed the probable path of a line drawn through or near those points and determined the equation of the line which is indicated in the block in the middle of the chart.

Q. Is the plotting of the equation of the line, having given [fol. 3216] a sufficient number of points to determine its course, a common and ordinary problem in analytical geometry?

A. Yes, sir.

Q. And is that the problem which you undertook to solve here?

A. That is right.

Q. And did you obtain the equation which would obtain the course of this line?

A. That is right, the equation.

Q. Will you read the equation, please?

A. The equation indicated in the center of the chart reading "M equals 0.042946 T to the 1.925 power," where M equals the number of meets and there should be added "and passes", and T equals the number of trains.

Q. Now, what use can you make of this curve as determining the number of meets and passes which will occur on the district between Yuma and El Paso via Gila and Lordsburg?

A. By means of this curve and given the number of trains operated on any particular day, it is possible to determine quite accurately in the average aspect the number of meets and passes which will probably occur.

Q. Now, what use did you make of the curve and the [fol. 3217] equation on sheet 2 then in plotting and making the showing on sheet 1?

A. We then proceeded to count the number of freight and passenger trains which had actually been operated between Yuma and El Paso on the first and fifteenth day of each of the twelve months of 1938. The results of that count are shown in columns A, B and C.

Q. And then how did you compute the figures in column D?

A. Then, taking the total shown in column C we go into the chart on sheet 2 and above the number of trains indicated in column C we find the point where the line crosses that number of trains and then go to the right to read the probable number of meets and passes.

Q. For example, to get the figure for January first, you plot the point at which the total number of trains falls on the scale of number of trains?

A. Yes.

Q. And then read the point at which the curve for the number of trains corresponds with that shown for January first across the scale of the number of meets and passes?

A. Yes, sir.

[fol. 3218] Q. Did you do that for each of the other 23 days shown for 1938 on sheet 1?

A. We did.

Q. How do you get the figure shown in column E for each of these days?

A. Column E is the figure in column A reduced by the percentage indicated at the head of the column.

Q. Where do you get the percentage indicated at the head of the column?

A. That comes from the block at the foot of the sheet and is derived from the number of trains actually operated and the number of trains operated on the redispatch in those four territories for the month of June and August, 1938. There is a blank showing for the exhibit, and I rearranged the order of my exhibits the other day, and I now find that the exhibit indicated is going to follow Exhibit 221 instead of preceding Exhibit 221.

Q. Your exhibit No. 214 contains the showing as to some of these districts?

A. It does as far as Lordsburg, but for the territory Lordsburg to El Paso Exhibit 214 includes several short El Paso Strauss turnaround trains which I didn't use in making this percentage computation.

[fol. 3219] Q. Are those the El Paso-Strauss turnarounds mentioned in the testimony of Mr. Herrell?

A. Yes. Some were operated in actual performance, but we operated more on redispatch.

Q. Well, I take it that the total figures in the lower block on Exhibit 221 for identification, may also be checked against the train sheets?

A. That is right.

Q. And the white work sheets A?

A. Yes.

Q. And the exhibit which you speak of which is to be introduced following Exhibit 221 for identification is likewise predicated upon the train sheets and white work sheets A?

A. That is right.

Q. You derive a ratio between the actual train and the redispatched train as shown by the actual train sheets and the redispatched train sheets for the entire territory covered, did you?

A. Yes.

Q. And that is the ratio of percentage which you used in obtaining the figure in column E?

A. That is right.

Q. Now, did you make any similar reduction in obtaining the total of redispatched passenger train, column F?

[fol. 3220] A. No, they were left the same. This percentage reduction applies to freight trains only.

Q. If there were any fewer trains operated, fewer passenger trains operated under this redispatching study, that has not been carried into this showing?

A. That has not been taken account of here.

Q. Now, to obtain the figures in column H, did you follow the same process as in obtaining the figures in column D?

A. That is right.

Q. By the use of the curve on the second sheet?

A. That is right.

Q. Now, as to the recapitulation, is that simply an addition of the figures appearing in the columns above?

A. Yes.

Q. Plus the multiplication to expand the showing for the annual bases?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: Yes. Mr. Sines, how did you determine the days that you used on page 2?

A. Those were selected to give us as big a range as possible by which to locate the course of the line. It wouldn't [fol. 3221] have done, for instance, to select days which would give a group of points immediately in the middle of the chart. We took a peak day, the peak day of 1938, June 18th, then went to August, which we know is the lightest month of 1938, and picked one of the lightest days in August, which is August first, in order to get a point way down on the curve.

Q. Now, then, column A on sheet 1, how did you arrive at that figure?

A. That is a count of freight trains from the actual train sheets made in the same way that we made the count of trains for the date as shown on sheet 2 of this exhibit, and also, as I have described in connection with Exhibit 229.

Q. Well, in other words, this is an actual count of trains operated on the day indicated, counting a train for each division through which it passes?

A. Yes.

Q. Then, passenger trains in column B, that would be the same?

A. The same.

Q. Now, then, column D is the application of the formula that you arrive at on page 2 to the totals shown under column C?

[fol. 3222] A. That is right.

Q. To arrive at what you denote as the probable meets and passes?

A. Yes.

Q. Now, the figure shown in column E, how did you arrive at that? I didn't quite understand that.

A. Well, by the tabulation at the foot of the sheet, I determined that the ratio of actual trains to redispatched trains was as 100 per cent is to 72.30 per cent, actual against redispatch, and that is again in its average aspect because we have June and August in there, so I applied that 72.3 against the count which I had previously made in column A.

Q. And by that arrived at the figures shown in column E., That would again be the probable number of freight trains operating in the redispatch?

A. Yes, that is right. Excuse me now. As the probable number of trains that would have been operated had we conducted a redispatching study on every one of those days.

Q. Now, the passenger trains, there is no change from the actual, is there?

A. No.

[fol. 3223] Q. Then column G is the total?

A. Yes.

Q. And column H, using that total in your formula, you arrive at what you term the probable number of meets and passes on redispatch?

A. Yes.

The Court: Your redispatching study didn't cover, though, all of the year 1938?

Mr. Strouss: No, June and August, wasn't it?

A. No, our redispatching study just covered two months of 1938, June and August.

The Court: Pardon me, then where do you arrive at these figures out here in the redispatch columns E and F for the ten months not covered by your redispatching study?

A. By applying the ratio of percentage there, 72.3. In the beginning, when I first described this redispatching

study, I said that we have chosen the months of June and August, 1938, because June is a peak month and August is the month of lightest traffic, and the results from that selection would reasonably give us a cross-section of operations for the year 1938. Now this 72.3 is taken from that, is taken from the maximum and minimum months, and I have applied it against the entire year.

[fol. 3234] Mr. Mason: 72.3 represents the number of trains operated during the two months of June and August on the redispatching study assigning a value of 100 to the number of trains actually operated during the months of June and August, does it?

A. That is right.

Q. So that, taking June and August as a cross-section of the year, you may fairly assume that the entire year's trains will be reduced in the same proportion?

A. Yes.

Q. Is that what you have done here?

A. That is right.

Mr. Mason: Have you any other questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has the Court any other questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Exhibit No. 221.

Mr. Strouss: The same objection as to the previous exhibits, as irrelevant and immaterial, calls for the conclusion of the witness, assumes facts not in evidence and purely speculative.

Mr. Mason: As to the assumption of facts not in evidence, [fol. 3225] I take it, your objection is not because the exhibit has not yet been introduced, because the train sheets, the actual and redispatch, and the white work sheets A, really form the foundation of the computation as to the number of trains, and those are in your possession, but as to the exhibit, that will be introduced.

Mr. Strouss: No.

The Court: Well, I will hear you on that, Mr. Mason. I am inclined to think the objection is good to this particular exhibit.

Mr. Mason: Your Honor, I think if the exhibit is understood, that the objection is no more tenable than the objection made to prior exhibits.

The Court: I might shorten this up—I don't know that you need to take this in the record unless you want to. It seems to me that we are rather building an inference upon an inference here.

Mr. Mason: I don't think it goes to that end. We are applying a mathematical formula to facts which we know. First of all, the formula itself is derived from the actual operations, and does not depend to any extent nor in any degree upon any redispatched operations; the formula is simply the derivation from the plotting of points which [fol. 3226] relate entirely to actual operations. Mr. Sines, as he explained in his testimony, selected altogether nine dates during the months of August and June of 1938, counted the trains operated on those dates, and from the actual train sheets counted the number of meets and passes which were made by those trains; then plotted those points on a chart, and then from the location of those points was ably, by the use of rather common mathematical process, to determine a curve which would pass through those points or so close to them as to indicate that it was the curve upon which those points would be located. Then, having located that curve and determined its equation, we proceed to the redispatching study. Now, the redispatching study shows for the two months which are representative of the year, the actual number of trains operated and the number of trains necessary to be operated to carry the same traffic without the restriction.

The Court: It seems to me, Mr. Mason, that that is the weakness in your link here.

Mr. Mason: Well, if the redispatching study is admissible or, let us say, for example, and I don't think there is any question about it, that Exhibit 220 is admissible as [fol. 3227] showing how trains did operate and how trains would be operated or were operated on the redispatching study by the same dispatchers, and it seems to us there can be no question as to that, then it is equally proper to take the work of those dispatcher as showing the number of trains actually operated during the entire two months' period and the reduction of those trains which would be accomplished, reduction in their number, I mean, which would be accomplished by operating free of the restriction. That is to say, that you can find out if you were operating 27.7 per cent less trains—that is not exactly the figure—but you would operate 72 trains, let us say, where before

you had operated 100 trains. The redispatching study shows that just as concretely as it makes the showing on the exhibit 220, which indicates that during the days there were operated 89 trains and under the redispatched operations there would have been operated 68 trains. Now, if we show during those two months we operated 100 trains and under the redispatched we would have operated 72, then taking those two months as representative of the year, we can expand that showing for the entire year and say that for the year, because the two months are representative, 72 trains would have been operated under long-train operation as compared to 100 trains operated under short-train operation, or, as the exhibit shows, as the train sheets show, 2,968 trains were operated during the two months actually, and without the law 2146 would have been operated. If the showing for the two months is representative of the years shown, it is representative for the purpose of obtaining a comparison of the number of trains to be operated during the entire year; and then it is only necessary to indicate the number of trains which would have been operated for each day, because the same ratio by and large will hold for the year, and every day of the year. It may be that more than the 72 trains operated would have been run on January first, but it is equally likely that the variation from 72 per cent would iron out when you take 24 days, or, especially, when you take the entire year. The purpose of the exhibit is not to show, necessarily, that exactly this number of meets and passes would have taken place either actually or with the lesser number of trains, but substantially what the proportion and the reduction would be. We know that the reduction would occur in accordance with the equation. The only thing necessary to do is to associate it with a series of days in order to obtain [fol. 3229] a cross-section of the year. This undertakes to show 24 days of the entire year. I can't see that it is building inference on inference, it is rather using a cross section of the year for the purpose of obtaining a result. We agree that it is possible that with the redispatched operation there would be more than 1,711 meets and passes for the 24 days, or more than that number expanded by 15.2 per cent for the entire year, and it might well be less, but it will vary very little from that figure, and certainly the relationship as between actual operation and redispatching operation is going to persist, because the mathematical formula used is

unquestionable. There cannot be any dispute as to that. Another mathematician of equal or greater competency than Mr. Sines would arrive at the same result, would arrive at the same curve, and would solve it in the same way, and the equation is not in any sense a speculation.

Mr. Strouss: I think the Court has stated my position entirely. Mr. Mason has shown the soundness of the objection. His whole argument is an argument of "ifs." This is purely a speculative proposition, taking trains which are shown by the actual and having two months of operation, [fol. 3230] then from that build up the year, assuming first the number of trains will be run in the redispatch, then having assumed that they assume that the meets and passes would occur; it is an assumption all the way through, and on top of that, of course, in order to build up through the year, they have to assume that the operating conditions would be the same all year around. If there was ever a case of evidence that is speculative, this is it.

Mr. Mason: In a sense, the redispatching study is predicated, of course, upon the assumption of a condition which, as we know, does not exist. It is predicated on the assumption that the law is inoperative and set aside.

The Court: So far as your redispatching study is concerned, the Court has ruled with the defendant. In that, the Court felt that you laid the proper foundation; you showed by experienced, skilled men who have spent months in these operations, and after all these various factors had been taken into consideration in these assumed operations, and in order to permit you to make the comparison the Court admitted in evidence the redispatching studies. But now, it seems to me, and I am not finding fault with the exhibit on account of a mathematical calculation involving [fol. 3231] the well-known principles of mathematics, even though it gets up into the higher realm, into trigonometry to do it, but, as Mr. Strouss has stated, it seems to me it is predicated upon too many "ifs" and too many different assumptions to make it of very much value. It seems to me it is highly speculative. The Court will sustain the objection to it.

Mr. Mason: I take it that the objection was principally because of the showing as expanded to the year by the application of the same ratio.

The Court: I think that is one of your weakest points.

Mr. Mason: That is probably the only point of the objection; there hasn't seemed to be any serious question, I don't think there has been any serious question by Mr. Strouss that the two months are representative of the year. We can show the ratio, of course, that the two months' traffic bears to the entire year. The point is this, a study of this kind could be made and restricted, if you will, to the two months, June and August, 1938, and escape the principal ground upon which the objection was made.

The Court: We will cross that bridge when we get to it.

Mr. Mason: We might make that study because I think [fol. 3232] it would be informative. There is no way of disputing the fact that with an increasing number of trains, meets and passes will increase and they will increase out of proportion. No one questions that seriously, I don't Mr. Strouss does. Again I suggest also that Sheet 2 of this exhibit which contains the derivation of the formula and which is based upon actual observations, observations of the actual operations and not in any sense upon the redispatch, is not open to the objection made and might well be received even though the conclusions on the first sheet are subject to the objection.

The Court: Well, of course, the exhibit was offered as a whole.

Mr. Mason: That is correct.

Mr. Strouss: I can't see where there would be any materiality to the second sheet.

The Court: The second sheet forms the basis for the data contained on the first sheet.

Mr. Mason: I take it that the second sheet in and of itself would still show, and I think it is very material to the case because the more meets and passes the more interference, and as our answer alleges, the more meets and passes the more hazards because men getting on and off trains to open [fol. 3233] and close switches must run to catch up with their train and must run ahead of the train.

The Court: There is nothing before the Court, Mr. Mason. It is so near the noon hour, we will take our noon recess at this time.

(Thereupon, at twelve o'clock M. the court stood at recess until two o'clock P. M. this day.)

[fol. 3234] 2 P.M., January 29, 1941.

All parties being present as heretofore noted, proceedings were resumed as follows:

B. S. Sixes resumed the witness stand.

The Court: You may proceed.

Mr. Mason:

Q. Mr. Sines, have you before you a chart in one sheet entitled, "Yuma, Arizona-El Paso, Texas, Via Gila and Lordsburg, Locomotive Requirements for Long Train Operation, June 16th to 20th, 1938"?

A. I have.

Mr. Mason: May this be marked exhibit No. 222 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 222 for identification.

Mr. Mason:

Q. From what source was this exhibit prepared?

A. This was taken from the redispatch train sheets.

Q. For what period?

A. For the period June 16th to June 20th, 1938.

Q. Why did you take that period?

A. That is the maximum five-day traffic period during [fol. 3235] June, 1938.

Q. What is the purpose of exhibit No. 222?

A. The purpose is to determine the minimum number of locomotives which will be required to fulfill the locomotive requirements developed by the redispatching study.

Q. Is it to obtain the figure of the minimum number of locomotives of the type contemplated for the redispatching study required to handle the maximum day's or maximum volume of traffic during the redispatching period.

A. Yes.

Q. Did you prior to the start of the actual work of redispatching have any discussion at your conferences with respect to locomotive requirements?

A. Yes.

Q. Did you reach any conclusion as to the probable number of locomotives which would be required to carry out the plan as then contemplated?

A. Yes, as a result of those discussions I estimated we would require thirty AC-8 locomotives to fulfill the requirements for the road locomotives. That was based upon actual performance of 1938 when we were running eight or nine trains in each direction daily, and I estimated [fol. 3236] that removal of the restriction of the 70-car limit law would permit us to reduce the movement of eight or nine trains to approximately six trains per day in each direction.

Q. Over each subdivision?

A. Yes, and then considering the distance from the terminals through which those locomotives would operate it was apparent we would need about five times those six locomotives in order to man the service and that gave me the total of thirty.

Mr. Booth: You said "ave times six locomotives." You mean five times the six trains, don't you?

A. That is right.

Mr. Mason:

Q. Was the study represented by exhibit No. 222 undertaken after the redispatching study was completed?

A. Yes.

Q. What were you undertaking to ascertain by this study?

A. What the absolute minimum requirement would be under that thirty. When I started the redispatching party of dispatchers that worked at Los Angeles at the beginning of the study, I gave them instructions relative to thirty AC-8 locomotives.

Q. Did you tell them they would have thirty AC-8 loco- [fol. 3237] motives in the pool for the main freight line between Yuma and El Paso?

A. That is the number I was figuring on tentatively although I expected to reduce that a little bit, but I did not want them to take the time and effort to redispatch the locomotives for the entire sixty days. I intended to take the train redispatching for the maximum period such as this, the five days between June 16th and June 20th, and assign locomotives to the trains as the requirements ap-

peared during that peak period after their redispatching study was completed.

Q. Could you by a study of the peak period determine the number of locomotives required for any other day during the period?

A. Do you mean for any other day other than the peak period?

Q. Perhaps I should reframe the question. Would the determination of the minimum number required for the peak period of traffic also constitute a determination of the number required for any other day during the two months' period studied?

A. Yes, if we found that a certain number of locomotives were able to move the trains during the peak period, surely that same number of locomotives would move a lesser number of trains.

[fol. 3238] Q. In your redispatching study, how did you contemplate that the locomotives assigned as train locomotives would be operated, that is, into and out of terminals and with respect to time at terminals?

A. For the purposes of this chart I figured that the locomotives would operate on the first-in-first-out basis and provided in all instances that there would be standby locomotives to man the services. It was possible to do that, I say in all instances with the exception of very short periods which will appear later and to which I will call attention. When I say first in and first out, I mean taking a terminal like El Paso where there would be several locomotives in the terminal at any time, that the locomotive that had been in there the longest or that had come in first would go out first.

Q. Did you contemplate any servicing at El Paso?

A. Yes, El Paso would be the point where the major repairs would be performed and would generally be the point where engines would be blown down and washed.

Q. Would they receive such servicing as necessary at Yuma or Tucson?

[fol. 3239] A. Yes, that same washing service would and could be performed at Tucson and Yuma also.

Q. Are you familiar with the requirements for periodical inspection of locomotives?

A. Yes, in addition to the washing which is given a locomotive after a certain number of miles has been covered

it is necessary that the engine also be given a Federal inspection at least once every thirty days.

Q. Does that take some time?

A. The engine should be out of service a minimum of twelve or fourteen hours.

Q. That is from the time it is received at the roundhouse until it leaves the roundhouse to go in service again?

A. From the time it comes into the terminal until the time it can go out again.

Q. Did your plan contemplate sufficient time at El Paso or some other terminal for the purposes of Federal inspection?

A. That is right.

Q. Is that Federal inspection performed by company employees, do you know?

A. Yes, it is performed by company employees.

Q. And a record is made of it, is it?

A. Yes.

[fol. 3240] Q. Now, will you explain just how this chart, Exhibit No. 222, is drawn? Does it purport, for example, to show the movement of locomotives?

A. It shows movement of trains and the assignment of locomotives to those trains.

Q. Is it somewhat similar to the chart which has been received in evidence as Exhibit No. 220?

A. Yes; exhibit No. 220 shows the train movements for June 18, 1938, and this chart also includes the train movements for June 18, 1938.

Q. You don't show any stops at intermediate points here?

A. No, the lines are drawn continuously from terminal to terminal except in the case of unusual occurrence, such as engine failures, and we had two during this five day period.

Q. Now, you show types of locomotives by different indications, do you?

A. Yes, both by indication and by engine type numbers written on the lines which represent the engines.

Q. Is there a particular designation for the AC type locomotive, for example?

A. The AC type locomotives is a continuous full line without any number designation at all. That is indicated by the legend in the middle of the sheet at the bottom.

[fol. 3241] Q. And what do the numbers or lettering, various phrases and numbers alongside the lines, indicate?

A. They indicate the designation of the trains to which these engines are assigned.

Q. Now, taking this solid line, I notice there is a somewhat heavier line which starts at the lefthand side of the sheet. What does that indicate?

A. I took two lines, one of them starting at the lefthand side of the sheet, and caused it to be drawn somewhat heavier than the rest of the lines merely to make it convenient to follow with the eye should we care to describe the history of that particular locomotive.

Q. Does the heavier line indicate anything more than any of the other solid lines?

A. No.

Q. It is simply for ease in following?

A. That is all.

The Court: Then you mean, Mr. Sines, that on this exhibit, taking one of your heavy lines for instance, would illustrate the movement of that particular locomotive during the five days in question?

[fol. 3242] A. That is right. I brought that heavy line up to the middle of June, 18th, and then an engine failure occurred there causing us to swap engines and trains, so I simply picked up another engine at Tucson, which was the first one ready to go, and followed that across the chart.

The Court: Well, I believe that the other day, in response to a question from Mr. Strouss, that you stated in your redispatching study that you didn't give numbers to the locomotives used, you had a pool from which you drew but no specific numbers were assigned?

A. That is right.

Q. Now, on this exhibit is a specific number assigned to the locomotive?

A. No, I still haven't assigned any specific number to the locomotive, neither do the dispatchers.

Q. But, even if a specific number is not assigned, the heavy line that we have just referred to does designate definitely a locomotive and its movements during the period covered by this exhibit?

A. Yes, with the explanation in the middle of the chart, I jumped from one engine to another.

Mr. Mason: Now, Mr. Sines, referring to this heavy [fol. 3243] line, I notice that it starts out at Lordsburg and is level; that is, it has no slope one way or the other for a considerable period. What does that indicate?

A. It means it is standing in Lordsburg awaiting service.

Q. From midnight until a later hour?

A. Yes, sir.

Q. Is this a chart of hours on the lefthand side of this chart?

A. Yes, that is a chart showing the hours, it shows a 24-hour period.

Q. The chart up and down indicates the district Yuma to El Paso?

A. Yes.

Q. According to scale?

A. Well, it is a pretty good scale.

Q. What happened to this heavy-line locomotive at 3:15 or 3:30 A. M. Thursday, June 16th?

A. He was put on a train and went to El Paso.

Q. Does the line indicate when he went to El Paso?

A. Yes, the time can be read approximately.

Q. Then the line, I notice, crosses perpendicular to the long axis of the chart down toward the foot of the chart; what does that mean?

[fol. 3244] A. That goes to the foot of the line of engines that are awaiting service.

Q. He is the last in, is he?

A. He is the last in, yes.

Q. All these lines above are engines in earlier, is that right?

A. That is right.

Q. Now, the line goes along parallel to the central axis of the chart. What does that mean?

A. That he stays in El Paso almost twenty-four hours.

Q. Does he stay in El Paso until he becomes first out?

A. That is right.

Q. How do you find out that he became first out?

A. Well, as trains leave El Paso subsequent to his arrival at El Paso, those engines that were there ahead of him are assigned to trains successively until he stands first out and he catches a train at the time indicated.

Q. Now, these lines at which these angling lines strike the line representing El Paso, represents arrivals or de-

partures of trains as the case may be, as shown by the redispatch train sheets?

[fol. 3245] A. Yes.

Q. Then your level black line at El Paso then returns to the El Paso station line at a point approximately ten A. M. on Friday, June 17th?

A. That is right.

Q. Then what happens?

A. He goes west on S. S. W. third 17.

Q. Does this angling line from El Paso to Lordsburg indicate that he is enroute during that period?

A. Yes.

Q. Then the time that the angling line strikes the station line to Lordsburg indicates his arrival at Lordsburg?

A. That is right.

Q. Then what happens?

A. Well, there is an engine available and ready for service at Lordsburg when he gets there, so they take him off to be serviced and the engine that is ready takes his train out.

Q. What happens to the locomotive represented by the heavy line?

A. He stays at Lordsburg for about four hours.

Q. Is that what you call "dropping back?"

A. Yes.

Q. And what is the effect of dropping locomotives back [fol. 3246] in that fashion?

A. That means that you have to provide more locomotives than where those engines run through.

Q. Does it mean that you generally have a locomotive available at the drop-back intermediate terminal?

A. Yes.

Q. Now, you show this same locomotive as staying at Lordsburg then until about five-thirty?

A. That is correct?

Q. Then what happens?

A. He catches a drag west going to Tucson.

Q. Now, between five-thirty, apparently, and about seven-forty-five, there is no locomotive at Lordsburg at all, is there?

A. That is right.

Q. Do I understand that where there is a locomotive line parallel with a station line, that indicates a locomotive stands at that terminal?

A. Yes, sir.

Q. If there is more than one such line, there is more than one such locomotive?

A. Yes, you can count them and that will give you the number of locomotives standing at the terminal.

Q. Do you show the progress of your locomotive with [fol. 3247] the heavy line westward toward Tucson?

A. Yes, he got as far as Benson where he was delayed for about forty minutes, and then went to Mescal where he became involved in an engine failure of another train.

Q. When was that; what time of the day?

A. About three A. M.

Q. On June 18th?

A. Yes.

Q. Now, do you show that occurrence in your chart of the movements of redispatched trains on June 18th on Exhibit 222?

A. That is right, that is on the redispatch chart on Exhibit 220.

Q. 220, yes.

A. It is also on the actual chart.

Q. There was an engine failure on the actual at Mescal, was there?

A. Yes.

Q. Shown on the chart on Exhibit 220?

A. That is right.

Q. And reproduced on the redispatch at Mescal at the same time?

A. That is right. Then we came along to determine what the locomotive requirements would be for this period, and [fol. 3248] we worked our way through that locomotive failure also.

Q. And the way you worked it through is indicated on the chart, Exhibit 222?

A. Yes, sir.

The Court: Well, was that particular locomotive withdrawn from service then during the balance of this period, June 19th to 20th?

A. Now, the locomotive failure occurred to an engine which was on Y308-309 going east, and when our engine

that we started originally at Lordsburg got to Mescal, they took that engine off the westbound drag and put it on the eastbound train, Y308-309. A helper then took our westbound drag into Tucson, and that is indicated by the dash line with the figures 5,000 under it. The locomotive which failed on Y308-309 is shown standing at Mescal until 2:10 P. M. when another drag train came along west, picked him up and pulled him into Tucson, and there is a notation there which says, "To shop," meaning that this particular engine on the redispatch went into the shop, and thereupon, for the rest of this two-and-a-half day period on this chart and also for the rest of the month we considered that that engine was out of service because that is what actually happened, the engine which failed at Mescal on June 18th [fol. 3249] at 3:00 A. M. didn't show up for service any more during June, 1938, it was in the shop at Tucson.

[fol. 3250] Mr. Mason:

Q. You mean you reproduced in the redispatch what actually occurred to the locomotive that actually failed early in the morning of June 18, 1938?

A. That is right.

Q. In order to trace the further course of the locomotive, did you pick up another AC locomotive which was standing ready for service at Tucson?

A. I might have turned back on Y-308-309 to follow the particular engine I started out with but I wanted to go over to Gila and Yuma for purposes of demonstration and illustration so I jumped up to the engine which was first out at Tucson and picked him up about 5:15. You will notice the horizontal line becomes heavy directly beneath the word "Ajo."

Q. That is another AC locomotive which you can trace from somewhere else?

A. Yes.

Q. You have only made it heavy here in order to bring it to the west of Tucson?

A. That is right.

Q. What does that locomotive do for the next few hours after you picked him up?

A. He has been at Tucson since a little before eleven P. M. the day before and he stays at Tucson until a little [fol. 3251] after eleven A. M. the next morning, when he goes out on the drag train leaving Tucson about 11:20 A. M.

Q. Where does he go?

A. He goes to Gila, drops back at Gila, catches the second train out of Gila after his arrival at Gila, and goes to Yuma. He is at Yuma five hours, catches the Colton fruit block back to Gila, drops back at Gila, catches the Y-316-317 to Tucson. He is at Tucson five hours, goes back on the GBW to Gila. He is at Gila only an hour and a half when he returns to Tucson and this time he stays at Tucson approximately nine hours before taking a train west.

Q. How can you tell that a locomotive is first out at a particular terminal?

A. By the mechanics of drawing this chart.

Q. When there are no lines between the station lines and the locomotive's own line drawn parallel to the station line?

A. Yes, that is the thing that determines whether he is first out or not.

Q. I notice at Tucson you show a number of dashed or dotted lines. What do those indicate?

A. Those indicate helper locomotives assigned to the Tucson-Dragoon territory.

[fol. 3252] Q. When those locomotives are standing still at Tucson, how is that indicated?

A. The line continues horizontally to the right.

Q. And when those locomotives are in active helper service handling or assisting trains, how is that indicated?

A. They are drawn along closely parallel to the train which they are assisting.

Q. Do you show them also returning light from the cut-off point back to Tucson?

A. Yes, they return light to Tucson in some instances and they are also shown coupling in with westbound trains at both Dragoon and Benson.

Q. I take it that the chart is entirely a time chart and does not attempt to show distances traveled by the locomotives but rather the time that they were engaged in particular services or waiting, is that correct?

A. Time is the essential element but you could compute miles off of this if you had the timetable in one hand and the chart in the other.

Q. You could figure out the locomotive miles made?

A. Yes.

Q. Could you also figure the hours enroute between ter-[fol. 3253] minals as contrasted with the hours spent in terminals awaiting service?

A. Yes.

Q. You show at the top of the chart immediately under the title the figure "27" for midnight June 17-June 18 and the figure "26" for midnight June 18-19. Are there other figures on the chart which correspond to those?

A. There are.

Q. What do they mean?

A. That is the count of the AC-8 locomotives made over twenty-four hours to indicate the number of AC-8 locomotives on that chart. The difference to which you called attention which occurs on June 18th with 27 in the morning and 26 at night is due to the fact that one of our AC locomotives has gone to the shop at Tucson and he stayed in the shop. As I have indicated heretofore, this count is also a verification of the accuracy of the chart. We start out at midnight, June 15th, June 16th, with 27 AC locomotives, that is, you can actually count them, 27 locomotives on that midnight line. Then the next midnight we can still count 27 locomotives, we get the same thing the following night and so on across the chart. In other words, [fol. 3254] we haven't picked up but we haven't lost any locomotives.

Q. You called attention to the showing of engine failure at Mesyal on the morning of June 18. Is there a showing of another engine failure on the chart on another day?

A. Yes, on June 19th in actual operation there was an engine failure at Cambray at approximately three A. M. to the engine pulling Colton block 413. We reproduced that on our redispatch train sheet and of course provided for it on this exhibit No. 222.

Q. How did you take care of C-413 and bring it to El Paso? Does the exhibit show?

A. Yes, on our redispatch operation the chief dispatcher Herrell allowed enough time for the train crew at Cambray to notify the dispatcher's office at El Paso that their engine had failed and to permit the office at El Paso to call a new engine crew and get a new engine ready and get it started west to Cambray. Its departure at El Paso is indicated about 4:30 and its movement thence to Cambray is indicated by the line with the word "light" above it. That engine got over to Cambray and about thirty minutes later towed

the dead engine and train C-413 into El Paso. That was not a serious failure, however; the engine returned to [fol. 3255] service. As I remember, that was just an air pipe that broke on that engine.

Q. You duplicated on the redispatch operation the actual failure including the actual disability that occurred to an engine in actual practice at Cambray at that time?

A. Yes. I should qualify that to this extent; I determined that it was an air pipe that broke but just when that engine went back into service at El Paso, I didn't check that.

Q. Would it be possible to make a chart of the actual engine movements from the actual train sheets during the period June 16th to June 20th, 1938, for the territory covered by exhibit No. 222 for identification?

A. Yes.

Q. Would it resemble this chart somewhat in the same manner, for example, as the actual and redispatch charts on exhibit No. 220?

A. It would look very much like it only it would have more lines on it just as the actual chart on exhibit No. 220 has more lines.

Q. I take it this showing covers only freight train locomotives and the helper locomotives used to handle those freight trains?

A. Yes.

[fol. 3256] Q. There is nothing here with reference to passenger trains or passenger locomotives?

A. No.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer exhibit No. 222 in evidence.

Mr. Strouss: The same objection as made to the previous exhibits.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 222.")

Mr. Mason:

Q. Will you explain again, Mr. Sines, just how you got the actual number of AC-8 locomotives required for the maximum or heaviest day?

A. The requirement developed by this chart applies for each day of the five-day period and not only for the maximum day; but the five-day period does include our maximum day, therefore, we know that the assignment that we have here will take care of any other situation that might [fol. 3257] arise in 1938. By providing sufficient lay-over time at El Paso, Tucson, and Yuma to service and wash these engines and by providing sufficient time at Gila and Lordsburg for servicing and by having standby engines at all these terminals with the exception of the short periods, some of which we have indicated here, we determine that 27 AC-8 locomotives will have been required for the first two and one-half days and that thereafter we could have gotten along with 26 locomotives. The actual determination itself is made simply by counting the number of locomotives in service at any one time.

Q. Including those standing by at terminals?

A. Yes.

Q. And the number of locomotives in service can be determined simply by counting the number of solid lines you cross at any hour?

A. That is right. I have counted them at midnight, but that count could have been made at any other hour during the day.

Q. Does the chart show how many locomotives were standing by available at any of these terminals at any particular hour that you want to select?

A. Yes.

Q. Simply by counting the number of parallel lines? [fol. 3258] A. That is right.

Q. Were you able by means of this chart to determine the number of helper locomotives required for the purposes of the redispatching study?

A. As to that I verified the judgment of the chief dispatchers who themselves figured on the number of locomotives they would require at Gila and Estrella and San Simon and Steins. You will recall in their testimony they said that they put engines and helper crews in service as needed. Mr. Baker provided for two 5000's and one 3700 engine at Gila and two 5000's at San Simon, and when we drew this chart it appeared that Mr. Baker's helper assignments were adequate. At Tucson I determined the helper locomotives from the assignments which had been made to individual trains as they were operated

out of Tucson on the redispatching study and those locomotives bear the same relationship to the making of this assignment as do the locomotives operating out of Yuma and El Paso.

Q. Does the chart show the use of train locomotives other than the A6' class where such locomotives were used?

A. Yes, on the redispatching study, dispatcher Baker figured he would have an assignment of 3600's, those are [fol. 3259] the light 2-10-2's, operating between Yuma and Tucson to handle trains known as the Ajo drags and the TXM's. Occasionally those trains were heavier than what a 3600 would handle, however, and it was necessary to put a 4100 on the Ajo drags and the TXM's. When the redispatching train sheet indicated that dispatcher Baker had done that, we reproduced his selection on this chart. The 3600's are indicated by the dashed line. One of them is shown leaving Yuma at 6:30 P. M., and prior to 6:30 P. M. at Yuma two of them are shown standing at Yuma awaiting service.

The Court: Mr. Sines, is the ore from the mines at Yuma hauled to the smelter at Douglas, or what is the nature of that load?

A. Those are concentrates and come from Ajo, coming into our main line at Gila, not Yuma. The concentrates are handled on trains from Gila into Tucson and go to Douglas.

Mr. Mason:

Q. Have you another statement in one sheet entitled, "Locomotive Assignment, Weight and Investment, Yuma, Arizona, to El Paso, Texas"?

A. Yes.

Mr. Mason: May this statement be marked "Defendant's Exhibit No. 223" for identification?

The Court: It may be marked.

[fol. 3260] The Clerk: Defendant's exhibit No. 223 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 223?

A. I prepared a considerable part of it, it was done under my supervision. I have checked it and it is correct.

Q. From what sources did you prepare it?

A. The information under the "Actual" is taken from the mechanical department's report of locomotive assignments as of June 30th, 1938, and also from an inspection of the actual train sheets to determine the locomotives which were in service, that is, I checked the mechanical department's locomotive assignments to see that the locomotives were actually in operation between Yuma and El Paso. The information shown under the "Redispatch" comes from the exhibit previously introduced, No. 222, with an allowance of 10 per cent for shopping, and finally I made a check between the actual and the redispatch based upon the reduction in the amount of service that would be required by the redispatched assignments.

Q. When you say an increase of 10 per cent to allow for shopping, you mean you allowed more locomotives than are shown for road service on exhibit No. 222?

[fol. 3261] A. Yes.

Q. Where does that appear? In what line and what column of exhibit No. 223 for identification?

A. In line 6, column D, the number there is larger by 10 per cent than the requirement which I indicated on the previous exhibit, No. 222.

Q. Did you assign helpers as indicated by the redispatched train sheets?

A. Yes.

Q. Are they included in your column D for redispatched assignments?

A. They are, and they may be checked against exhibit No. 222 directly with respect to the Gila-Estrella helper district and the San Simon-Steins helper district. The Tucson-Dragoon helper district assignment on exhibit No. 223 is larger by three units than the requirement indicated on exhibit No. 222. This was because at other times of the month of June dispatcher Baker used engines other than what had been used during the five-day period.

Q. Having gotten the figures in columns C and D in the manner that you have explained, how did you get the figures in the recapitulation, lines 9 and following? Was that entirely by computation?

A. Yes, average light weight of locomotive and tender [fol. 3262] comes from averages I made from mechanical department's record of weight of these locomotives.

Q. Those are based upon the actual records of the mechanical department, are they?

A. Yes, and the actual assignment, column G, is a recapitulation as indicated by a check of the total; column H is a multiplication of the weight in column F by the number of units in column G. The same process is followed with respect to columns I and J. Lines 17, 18, and 19 are derived from information shown in line 16 and also the price per pound indicated in the note at the bottom of the exhibit.

Q. Where did you get that figure of the price of an AC-8 locomotive as shown in the note at the bottom of the exhibit?

A. That was an estmiate which was furnished to me by the mechanical department and it was testified to by Mr. F. E. Russell when he was here at the beginning of the trial.

Q. Is that the figure testified to by Mr. Russell on the first day of the trial?

A. Yes, sir.

Q. I take it that the computation of the price per pound is simply a division?

A. That is all.

[fol. 3263] Q. Have you checked these computations?

A. Yes.

Q. Have you checked the information in the upper block of the exhibit against the actual and redispatch train sheets in the preceding exhibits to determine its correctness?

A. I have.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has the Court any questions?

The Court: This exhibit shows, then, by the use of this heavy equipment or consolidated locomotives that in your redispatch you are able to decrease by twenty-one the number of locomotives necessary?

A. That is right.

Q. And there is an actual increase in the locomotive weight as shown in line 18?

A. Yes.

Q. And then your computation down on line 19 would indicate that your capital investment to provide these

heavier locomotives would run into the last figure shown on line 19?

A. That is right.

Mr. Mason: We offer the exhibit in evidence as defend-
[fol. 3264] ant's exhibit No. 223.

Mr. Strouss: Same objection as made to defendant's exhibit No. 221.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 223.")

[fol. 3265] Mr. Mason: Now, Mr. Sines, have you any method of checking the correctness of your computation as to the number of locomotives required for the redispatch operation?

A. Yes; for June 1938, the actual locomotive miles compiled as a part of our redispatch study for the territory Yuma to El Paso was 312,931, and for the same month of June the redispatched locomotive-miles were 214,018. This means that there was a reduction of 31.5 per cent in locomotive mileage during the month of June, actual against redispatched. The locomotives assigned to the main line between Yuma and Tucson were 69 in number, that is, 74 less the five shown between Tucson and El Paso on the south line.

Q. You say between Tucson and El Paso, you mean between Yuma and El Paso via the north line?

A. Yes, that is right, via Gila and Bowie,—will reduce the 69 by the 31.5 per cent, and we find that 47 locomotives would be required if the locomotive requirements descended in the same proportion that the locomotive-miles go down. I have actually provided 48 locomotives for that same territory on the redispatch operation, 48 being the difference between 53 and five on the south line.

[fol. 3266] Q. You have made no reduction in the number of locomotives required for the south line?

A. No, the number of trains operated were the same each day, actual and redispatched.

Q. You haven't calculated the locomotive-miles on the south line in the computation you have made in the relationship there?

A. No.

The Court: We will take our mid-afternoon recess.

(Thereupon, a short recess was taken, after which the witness B. S. Sines was recalled to the stand, and proceedings were resumed as follows:)

The Court: You may proceed.

Mr. Mason: Mr. Strouss, Mr. Sines asked me to say that he has the 1938 locomotive assignment which was used in connection with Exhibit No. 223.

Mr. Strouss: That is the one I had yesterday.

The Witness: That was November, 1940. This is the one that was used to provide part of the information on Exhibit 223.

Mr. Strouss: I think I will enjoy myself looking at the lines rather than at the figures.

Mr. Mason: Mr. Sines, have you before you an exhibit in one sheet entitled, "Tucson and Rio Grande Divisions Through Freight—Pool Service Additional Cabooses and [fol. 3267] Caboose Investment Required by Arizona Train Limit Law."

A. I have.

Mr. Mason: May we have this statement marked No. 224 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 224, for identification.

Mr. Mason: Did you prepare this exhibit, Mr. Sines?

A. It was prepared under my direction. I have checked it and it is correct.

Q. Now, from what source did you take the information shown, let us say, in column D, for these various districts?

A. That comes from the white-work sheets A, the recapitulations, which show the train miles operated in those districts for the month of June.

Q. Do you get the column G figure from the same source?

A. Yes.

Q. Where do you get the figure in column E?

A. Column E comes from a record entitled "Car Dispatcher's Record of Trainmen," also known as Form 7080.

Q. Now, how can you determine from the record of train- [fol. 3268] men the cabooses in service on a particular district?

A. Each time a crew departs and leaves a terminal, a record is made of it on this form showing the names of members of the crew and the caboose used at time of departure or arrival, and also identification of train upon which the caboose was operated. By examining the crew record for a month and counting the numb.. of cabooses that appeared thereon, it was possible to determine the total number of cabooses assigned.

Q. Generally speaking, is each assigned crew also provided with an assigned caboose?

A. Yes.

Q. Now what provision, if any, do you make for extra crews or spare cabooses, if any are required? Does your book show those too?

A. Yes, when extra crews are called, the book shows the departure of those crews and the caboose number that they used on the train.

Q. Did you from examination determine the actual number of the separate individual cabooses that were used in June on the Yuma-Gila district, for example?

A. Yes, sir.

Q. And the same way for each of the other districts?

[fol. 3269] A. That is right.

Q. Was the same process followed in August?

A. Yes.

The Court: Is a freight conductor assigned a specific caboose which he uses whenever he is on the run?

A. If he is in regular assigned service, he does have a regularly assigned caboose. That caboose stays with him sometimes for long periods.

Q. Is that true with an engineer with his locomotive?

A. No, sir; an engineer may have a succession of different engines on each run.

Mr. Mason: Now, how do you obtain the figures in column F?

A. That is the result of a mathematical computation, dividing the train-miles in column D by the number of assigned cabooses in column E, and produces the average miles per month per assigned caboose.

Q. Now, then, the figure in column G is obtained from the redispatch train sheets through the white work sheets?

A. That is right.

Q. Then, how do you proceed from that point of the ex-
[fol. 3270] hibit?

A. Using the same average number of miles per month per caboose, we determine what the caboose requirements would be for a reduced number of train miles. That is done by dividing the figures in column G by the average monthly miles in column H to produce the figure in column I. That didn't always come out even, but the next highest full number was used in putting the result in column I.

Q. In disposing of fractions then, you took the next highest whole number if you didn't have an approximate exact division, is that correct?

A. Yes.

Q. I take it that the figures in line 5 are simple additions?

A. That is right.

Q. And the division of column G by column H is for the purpose of checking the figure shown as the total in column I?

A. Yes.

Q. Did you follow the same process as to August?

A. Yes.

Q. Why did you work out the August requirements having the June requirements worked out?

A. Well, to demonstrate that there will be a reduction in
[fol. 3271] requirements in both August and June.

The Court: How do you account, Mr. Sines, for the fact that there would be such a difference between the month of June and August there as to make the saving in cabooses twenty-one for the one month, and for the other only ten?

A. The total train-miles in each month is considerably different. For instance, in line 5, we see 262,000 train-miles, for June, whereas in line 11 there are only 153,000 train-miles. Now, reducing each one of those by the same percentage will mean that the reduction for the smaller number will be smaller than the reduction for the larger number.

The Court: In other words, the business in June was far in excess of what it was in August?

A. Yes, there was 70 per cent more business in June than in August, basing that on train-miles operated.

Mr. Mason: How do you arrive at the figure of unit cost of a caboose?

A. That was the recorded cost of the last steel cabooses which we had manufactured when this exhibit was prepared.

The Court: When you say "steel caboose" you mean steel underframe?

[fol. 3272] A. No, sir, all steel construction.

Mr. Mason: Is that the type of caboose now being purchased or built by the company?

A. Yes.

Q. From what source do you take that cost figure?

A. From records of the mechanical department.

Q. I take it that in getting the final figure in line 13, you simply multiply?

A. That is right. May I add a little something to this with respect to the question a moment ago why I had shown both August and June. I wanted to be sure and to demonstrate that after I had reduced the 21 cabooses in June, leaving 56, that that number would not be smaller than the net figure left after I had reduced my August assignment.

Q. In other words, you wanted to make sure that your June assignment would still cover your August requirements?

A. Yes.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No, not at present.

Mr. Mason: Has the Court any further questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defend-
[fol. 3273] ant's Exhibit No. 224.

Mr. Strouss: The same objection as to Exhibit 221 for identification.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked, "Defendant's Exhibit 224.")

Mr. Mason: Have you before you, Mr. Sines, a statement in one sheet entitled "Yuma, Arizona-El Paso, Texas, Summary of Investment Charges and Annual Charges Incident to Adoption of Long Train Operation?"

A. I have.

Mr. Mason: May we have this statement marked Exhibit 225 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 225 for identification.

Mr. Mason: Did you cause this exhibit No. 225 to be prepared, Mr. Sines?

A. Yes, I prepared some of it, and have checked it and it is correct.

Q. Are the figures shown hereon taken from preceding exhibits?

A. That is right.

Q. What is the source of the figures shown in column A [fol. 3274] for siding extensions, is that Mr. Herbert's exhibit?

A. Mr. Herbert's exhibit. I guess I could have saved some time by indexing these. Exhibit 202 shows $685,985 total increased investment in sidings.

Q. Now, where do you get the roundhouse and shop facilities, the figure in column A, is that Exhibit 205?

A. Exhibit 205 shows an increase of $453,832 in roundhouse and shop facilities.

Q. And the locomotive investment is from one of your own exhibits recently received?

A. That is right. That is from——

Q. 223?

A. Yes.

Q. And the caboose investment decrease is from exhibit 224?

A. That is right.

Q. What is the purpose of the showing in columns B and C?

A. To convert these investment figures into annual charges by applying interest and maintenance and depreciation rates.

Q. Now, first as to the item of interest, columns B and C, you show a particular figure in column B as the interest [fol. 3275] rate. Where do you get that figure?

A. Well, four per cent is a percentage rate which is a judgment figure of what we can do in getting new money nowadays, and it is on the conservative side, inasmuch as our last bond issue in 1936 was at the rate of three and three-quarters per cent, and money which we are getting on equipment trusts is at a much lower rate of interest than that.

Q. Locomotive and caboose investment would be on an equipment trust basis?

A. Yes.

Q. Now, have we any current obligations on which the interest rate is less than four per cent, well, for example, the R. F. C. borrowings?

A. Yes, just what it is I don't know, but I checked these interest rates before I used the four per cent and I know it is less than four.

Q. When you say "conservative" you mean this is a higher rate than the cost of money has been to the company for purposes of this kind in recent years?

A. Yes.

Q. If a higher rate were used here, would that increase the annual charge?

[fol. 3276] A. Yes, sir.

Q. Now, what is the source of the figures shown in column D, as the maintenance cost for sidings?

A. That is a judgment and experience figure which I draw from my own experience in the maintenance department, and which provides at the rate of ten cents per track-foot, a maintenance charge of $528 per track-mile. That $528 per track-mile compares favorably with branch line maintenance charges of $250, $300, and $400 per track mile, where I have had occasion to make studies to determine the maintenance charge per mile or per track-foot.

Q. Will you say whether or not, based upon your experience in the maintenance department, ten cents per track-foot for siding is an ample allowance or a mere average allowance?

A. Fully adequate.

Q. Now, what about the depreciation rate or maintenance rate in per cent shown in column D for the roundhouse and shop facilities?

A. That is the result of a study which was made by the valuation department at my request, and is based upon an analysis of investment and maintenance charges to account [fol. 3277] 235. The title of account 235 is "Shops and Engine Houses." The maintenance rate for the caboose investment is a figure derived from the 1938 annual report. (Addressing Mr. Strouss) I think you have the 1938 annual report.

Mr. Strouss: To the I. C. C.

A. Yes.

Mr. Mason: This figure is taken out of the 1938 annual report, is it?

A. Yes, it is a computed figure, dividing the cost of repairing our freight-car equipment, including cabooses, by the total investment in that equipment. We don't have any repair rate per caboose-mile, so I developed this percentage rate from the figures that I have described.

Q. Cabooses are maintained and repaired in the same facilities and in much the same way as freight boxcars, are they?

A. Yes.

Q. Now, where do you get the depreciation figures in columns F and G?

A. Well, the locomotive investment depreciation figure is the rate which we are charging, and shows in schedule 284 of our annual report to the Interstate Commerce Commission, as does also the figure of 3, the depreciation rate [fol. 3278] for caboose investment, in which I use the depreciation rate for freight car equipment. Again, we don't have a caboose investment depreciation rate.

Q. They are grouped with the other freight-train rolling equipment, are they?

A. Yes, in our reports to the Interstate Commerce Commission.

The Court: Well, Mr. Sines, I find difficulty in reconciling your Exhibit 225 with reference to the caboose item with your Exhibit 224. Now, on Exhibit 224 you conclude that there is an additional caboose investment required, $71,694, which item is carried forward into column A, your total investment here, but throughout on this line of caboose investment you have indicated a decrease.

A. That is right. That is probably due to my selection of words in describing the items on 224. My total says "additional cabooses and caboose investment required by Arizona Train Limit Law." Putting the reverse on that means an investment which would be saved if the law were set aside.

Mr. Mason: Do you mean that the exhibit No. 224 shows, in so far as the figure at the bottom is concerned, that is a $71,000 plus investment, which would be unnecessary and [fol. 3279] would be saved if long train operation according to your contemplated plan were followed?

A. Yes.

Q. Whereas, in the case of locomotives there would be an additional investment of $284,000 to carry out the long train operation?

A. That is right.

Q. So, one of these is a credit charge against the debit charge of the other?

A. That is right.

Q. Whichever side of the picture you chose to look at?

A. Yes, and I reversed this procedure here without thinking where it might lead to.

Mr. Mason: Does that make it clear to your Honor?

The Court: Yes.

Mr. Mason: Now, in this computation here, have you taken the reduced caboose investment as a credit against the added investment required for the other items?

A. I have. The total is the net figure. The total in the last line is in each case a net figure of the sum of the first three figures in the column minus the caboose investment figure.

Q. Do you undertake by exhibit 225 for identification to [fol. 3280] show what the annual increased charges would be incident to the changes in investment required if the law were set aside and the company were to operate as contemplated by the redispatching study?

A. Exactly.

Q. And this amount indicated as the net annual increase in charges would be an offset against whatever money the company might save as operating charges or otherwise, if it operated long trains according to the plan that you have outlined?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has the Court any questions?

The Court: I think not.

Mr. Mason: We offer the exhibit as No. 225.

Mr. Strouss: The same objection as to the previous exhibit.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked, "Defendant's Exhibit No. 225.")

Mr. Mason: Have you a statement before you, Mr. Sines, in two sheets entitled, "Redispatch Study—Operating Sta-
[fol. 3281] tistics, Yuma, Arizona, to El Paso, Texas, Excluding Phoenix Line for Period June and August, 1930?"

A. I have.

Mr. Mason: May we have this statement marked No. 226 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 226 for identification.

Mr. Mason: Did you prepare Exhibit No. 226, Mr. Sines?

A. It was prepared under my direction. I have checked it, and it is correct.

Q. I take it that it has been checked several times?

A. That is right.

Q. From what sources?

A. From the white work sheets A.

Q. Does that go back to the original and redispatch train sheets?

A. Yes, the white work sheets are recapitulations of the actual and redispatch train sheets.

Q. What is the grouping of districts; what is the purpose of that?

A. To analyze the results of the redispatching study for for the territory, Yuma to El Paso via Gila and Bowie, set-
[fol. 3282] ting those results up by individual freight train districts, then to show the results on the south line between El Paso and Tucson via Douglas, show the total on the south line, bring the total north and south lines together, show what the changes are in percentages, and, finally, to expand the changes to an annual basis.

[fol. 3283] Q. I take it that the designation "North Line" as used here means the main freight line via Gila and Lordsburg?

A. That is right.

Q. And the term "South Line" as we have been using it throughout these proceedings is the line via Douglas?

A. Right.

Q. You show on the face of sheet No. 1, particularly in columns E and F certain note references, and F note one of those is carried in other columns. Are those explained on the second sheet?

A. Yes, the second sheet contains those note references and also the derivation of the percentage used in the subdivision XIII at the bottom of sheet No. 1.

Q. The ratio shown in subdivison XIII of the exhibit is derived by taking the actual operations for the two months and the actual operations for the year and comparing them?

A. Yes.

Q. And is used solely for the purpose of indicating what the redispatching study develops for two months carried to an annual basis?

A. That is right.

Q. It does not enter into the computations otherwise [fol. 3284] on the sheet, does it?

A. No.

Q. In obtaining these figures of number of trains, are these by an actual train count?

A. That is right.

Q. And the train-miles are likewise from an actual count of the figures for each train as they appear on the white work sheets A?

A. Yes.

Q. What about the other locomotive-miles?

A. For every train-mile there must be at least one locomotive-mile, but in addition to that one locomotive-mile per train mile there will be helper-miles, helpers returning light, light engine movements, double-header engine movements, which go to make up the total locomotive mileage in any district. You will see by checking that the figures in column D are the sums of the figures in the preceding two columns.

Q. When you speak of "saving for period," do you mean just the two months, June and August, 1938?

A. That is right.

Q. Are those, generally speaking, the differences between the actual figures and the redispatch figures?

[fol. 3285] A. They are.

Q. When you get over to the number of cars, have you made an actual car count of the cars handled on the actual trains and the cars handled on the redispatched trains?

A. Yes, those are the cars accounted for on the actual and redispatch studies and consist of the count made of the trains entering the terminals. For instance, the first count

is made of trains entering Gila. Some point had to be chosen to make the count, and we arbitrarily selected the arriving terminal.

Q. That would be of eastward trains, I take it?

A. Yes.

Q. Westward you would count the trains as they entered what terminal?

A. Yuma?

Q. Between Yuma and Gila?

A. That is right.

Q. Referring to column E, how did you get at the number of cars, is that an accurate count of the cars as they were handled?

A. That is the number of cars that entered Gila eastward and Yuma westward added together.

Q. You explain by reference to note No. 1 on sheet No. 2 just what this difference between the cars handled amounts [fol. 3286] to and how it came about?

A. Yes.

Q. How do you arrive at the figure in column F? Is that a division in column E by the corresponding figure in column A?

A. It is.

Q. Except, of course, as to the saving for the period?

A. Yes, that has to be a difference.

Q. Is the same process gone through with in blocks 1, 2, 3, and 4 that you have indicated for block 1 in these last few questions?

A. That is right.

Q. Going to block 5, will you explain the "turnaround trains"?

A. In actual operation during June and August there were a number of turnaround trains operated which are indicated in column A, but on the redispatch operation there were a large number operated. Turnaround trains operated from El Paso to Strauss usually with an even one hundred cars. They set those cars out at Strauss and return with a light engine and caboose to El Paso. In counting the number of turnaround trains, the movement west was counted as one train and the movement east was counted as one train, so that a roundtrip of this turnaround train was [fol. 3287] counted as two trains in column A, but in column E we only have deliveries being made at Strauss on the westward leg of each of these trips and in order not to lead

to any misconception, when we computed the average in column F we didn't take the sum of westward trains and the sum of eastward trains, one train of 100 cars and the other of no cars and get an average of fifty, but we have shown the number handled on the westbound leg of the trip.

Q. Does this El Paso-Strauss turnaround operation enter into the averages that are shown under the heading in block 6, "Cars per Train," column F?

A. No, and their absence is indicated by note No. 6 on sheet No. 2 which says, "Average cars per train computed, omitting El Paso-Strauss turnaround trains and cars handled by those trains."

Q. Going to the South Line block, blocks VII, VIII, and IX, Mr. Sines, you show, for example, that there were more cars handled in redispatch than there were in actual operation, is that correct?

A. Yes, we took trains off the North Line, we took empty cars off the North Line and sent them through Douglas both eastward and westward.

[fol. 3288] The Court: The same explanation applies to this as to what you have already testified heretofore?

A. Yes, sir.

Mr. Mason:

Q. This is simply a grouping in one place showing operating statistics derived from the redispatched train sheets and white work sheets A?

A. That is right.

Q. Is the entire exhibit brought to one total in block XI.

A. Yes.

Q. And that again is explained as to the totals and averages in column F by note No. 11?

A. That is right.

Q. These percentages in block XII, are those computations from the figures immediately preceding in block XI?

A. Yes, and are capable of check from the face of the exhibit.

Q. I wish you would go to the block on sheet No. 2 of the exhibit, "Derivation of Ratio." How did you determine the gross ton-miles for the months of June and August?

A. That is from information regularly compiled by our accounting department in connection with statistics that [fol. 3289] appear on form 521. 521 is not broken up into

these particular districts, however, so I went back of the form 521 in that regard but they are figures regularly compiled.

Q. These are figures from the same sources as form the basis for the forms 521?

A. Yes.

Q. Are they kept by months?

A. Yes.

Q. They are computed for those districts, I take it, from the conductors' wheel reports?

A. Those are the basic records, yes.

Q. Of course, the same source would give you the figures for the entire year 1938?

A. Yes, sir.

Q. What does the percentage figure at the foot of the block, "Derivation of Ratio," represent?

A. That represents the percentage that the business handled during June and August bears to the total business handled during the year 1938.

The Court: Those are actual figures?

A. Yes, sir.

Mr. Mason:

Q. This is business actually handled and moved over the line in the year 1938 for the two months referred to?

[fol. 3290] A. That is right.

Q. What use do you make of that ratio that you thus developed?

A. I expend the results obtained during June and August, 1938, to indicate what the figures would be on an annual basis.

Q. That is somewhat similar to multiplying the two months' figure by six to get a twelve-month figure except you have used a different multiplier?

A. We have done that, one sixth would be 16.67 per cent and it happened that in 1938 the business for those two months was 17.89.

Q. Is this the same method of expanding to an annual basis that has been used in the previous redispatch studies in the first Arizona case and the Nevada Train Limit case?

A. Yes, the first Arizona case had three months and they expanded their three months to an annual basis; the Nevada case had two months and we expanded those two months

to an annual basis. This study has two months, and I hereby expand those two months to an annual basis.

Q. Would you say, Mr. Sines, basing your answer upon your experience in connection with this and the prior Nevada case and other cases and matters in which you have [fol. 3291] made studies and your general experience in the Bureau of Transportation Research, whether this expansion of a cross-section of a year to an annual basis by this method represents a fair method of arriving at the total for the year?

A. It does.

Mr. Strouss: I object to that as calling for a conclusion.

Mr. Mason: I based it upon his experience, your Honor, and I think he is fully qualified in that respect.

Mr. Strouss: Whether he has used a fair method or not, I think is objectionable.

The Court: The objection will be sustained.

Mr. Strouss: I move the answer be stricken.

The Court: It may be stricken.

Mr. Mason: I take it that the objection being sustained the question and answer are of no significance in the record. Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit as defendant's exhibit No. 226.

Mr. Strouss: The same objection as made to exhibit No. [fol. 3292] 221 for identification.

The Court: I will hear you on one phase of that. It seems to me that the Court to be consistent with the ruling made on exhibit No. 221 that possibly the last block, block XIII, might be objectionable. However, there may be a distinction there between the principle governing the two exhibits and I will hear you on it. I am going to overrule the objection as to the first twelve blocks of the exhibit.

Mr. Mason: Your Honor, I think perhaps some distinction can be observed between the two. The showing on exhibit No. 221 for identification was simply taken by months for two days of each month for a twenty-four-day showing and then expanded to an annual basis after being averaged. Here, the two months, it has been testified, are the high and low months of the year, and they have been testified to

without objection to be representative months of the entire years. In order to obtain an annual figure which will have some significance, and I may say that it doesn't make a great deal of difference except for the purpose of obtaining some fairly accurate result whether you take a multiplier of six or a multiplier represented by one hundred divided by 17.89 or what multiplier you wish to take, but there must [fol. 3293] be some multiplier taken to expand two months' showing to indicate an annual result. Now, it seems to us, and the witness testified that he had taken the gross ton-miles, which, of course, represent the total tonnage hauled over the district during the two months and during the twelve months. It is certainly reasonable and certainly fair to assume that if in the two months' period studied approximately 18 per cent of the year's business was handled, then the number of actual trains operated in the course of a year would be in the proportion of eighteen to one hundred, or rather, one hundred to eighteen, approximately, and that in the same way if the business was handled in the redispatch study for those two months in 2,498 trains, in the course of a year the figure representing the total business handled would be approximately five and one-half times as much, or would take about five and one-half times as many trains. We suggest there is no other method, short of taking some multiplier, by which a cross-section of a year's business can be expanded, so as to represent the total for a year, other than this method here. It does not necessarily mean that you have to take the gross ton-miles. Perhaps the train-miles for the year would have been an equally [fol. 3294] satisfactory figure, and probably would not have produced a greatly different result. Perhaps the total car-miles, or some other figure between a two months' period and twelve months' period on some other basis, could have been used. It would have been perhaps sufficient to multiply the result of six, except that we know the business is not exactly constant and this exhibit shows it; but there must be some method short of studying the entire twelve months and redispatching it to get a figure for the twelve months which will be sufficiently accurate for the purposes of this case. The objection, in short, does not go to the admissibility of the testimony, but rather goes to the weight which is to be given, having in mind this particular method of expanding the showing for the two months so as to represent the showing for the twelve months.

Mr. Booth: I should like to be heard just a moment, your Honor.

The Court: You may proceed, Mr. Booth.

Mr. Booth: I think we should approach the reception of evidence of this kind with a somewhat realistic view as to how the testimony is being applied. If this were a suit against the state of Arizona for damages for enforcement [fol. 3295] of the Train Limit Law, it is obvious it would be much different and a more definite type of evidence would be required than has been presented by this exhibit and the other companion exhibits. If this were an action upon an insurance policy to recover damages, the same would likewise be true. But this evidence is addressed to the issue as to whether this law burdens interstate commerce being carried on by this defendant and is responsive to the allegations in the answer that it does burden and burdens it substantially. Now it make- no difference for the purposes of this case whether our annual burden is two hundred thousand or five hundred thousand or a million dollars. The only thing we are required to show under any of the decisions with which I have any acquaintance is that the damage be actual and that it be substantial. I think no one could listen to the testimony in this case or even contemplate the case without hearing any testimony, without being convinced that there could be a substantial saving to this company by the operation of trains free from the restrictions of the law. Everyone knows that it costs a certain amount per train-mile depending on the type of power used, the amount of fuel consumed, wages paid, and all that sort of thing to run a train one mile and everyone [fol. 3296] must know and certainly the evidence in this case has already fully developed that the defendant in this case could run a substantially less number of trains in the state of Arizona to transact its business that is originated here, delivered here, and moves across the state if it were not for the restriction of this law. To come back to my first proposition, I think we should approach the reception of evidence of this kind from a realistic standpoint. The defendant is trying to prove that its operations are substantially burdened by this law in that at a large expense it is necessary for it to run a substantially greater number of trains day in and day out than it would otherwise run if it were not for this law. As I said before, we are not held down to a meticulous showing of any definite amount per

year; for we are not asking for judgment in any amount; but are simply presenting evidence which in the last analysis the Court must draw the conclusion whether or not the defendant is substantially burdened by the enactment of this law. The production of these figures, as Mr. Mason very well said, could have been on a train-mile basis. That was one method used in one of these cases. It could have been on a car-mile basis. It might have been on almost any [fol. 3297] basis, but no matter what basis was used, if you consider what might be done, as has already been abundantly shown, if this law were lifted, no matter what basis was used, some substantial saving would have been effected and it is for the purpose of proving substantiality rather than any definite amount that this evidence is offered.

Mr. Strouss: That is sort of an invitation to me to argue the evidence before it is in, but I refuse. What Mr. Booth has said is true, of course, on the question of whether the cost is substantial or not or that they would be required to prove a definite amount, but we have in the last two exhibits a situation where this one just offered, by taking two months and multiplying by a ratio would develop that two months' so-called "savings" into a year's savings. Then, on the other side, we have the picture of their idea of the investment which would be an added cost by reason of long-train operation, one to offset the other. Now there may come a situation here where this investment cost and the claimed savings would be rather close together and there would be considerable question whether there would be a substantial saving or not. There is hardly anything [fol. 3298] upon which to determine whether there is a substantial saving or substantial burden by reason of additional costs.

The Court: You have this situation with reference to this exhibit, as I understand Mr. Sines' testimony, that the percentage of 17.89 is an actual percentage based—I am not speaking now of the redispatch operations—but it is based upon the percentage of the actual operations for the months of June and August as compared with the total operations for the year.

Mr. Strouss: That is true, but it does of necessity have to assume that operating conditions, in order to have the same relative savings as claimed here, there would have to be an assumption of operating conditions, availability of

traffic, and all of the other things that would go to the redispatch trains in some of those other ten months as the two months here.

The Court: Well, the Court is of the opinion there is a distinction between the two exhibits, and might say I am wholly satisfied in my own mind as to the ruling made on exhibit No. 221. I will overrule the objection and let the exhibit in evidence. We will take a recess at this time until tomorrow morning at ten o'clock.

[fol. 3299] (The document referred to was received in evidence and marked "Defendant's Exhibit No. 226.")

(Thereupon the court stood at recess until ten A. M., Thursday, January 30, 1941.)

[fol. 3300] January 30, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

B. S. Sines was recalled to the stand, and testified further as follows:

Direct examination (Continued).

By Mr. Mason:

Q. Mr. Sines, will you take up next a statement in six sheets entitled "Arrival Time at El Paso, Texas, of Fruit Blocks and Manifest Sections, Actual Operation Compared With Redispatch Operation, With No restriction and Using AC Power and Long Sidings. Months of June and August, 1938?"

A. Yes.

Mr. Mason: May that be marked Exhibit 227 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 227 for identification.

Mr. Mason: Was this exhibit prepared under your supervision, Mr. Sines?

A. It was. I have checked it, and it is correct.

[fol. 3301] Q. From what sources was the exhibit prepared?

A. From the actual and the redispatch train sheets.

Q. Now, I take it that the first sheet is merely a summary of the detail showing on the second and succeeding sheets down to and including the sixth, isn't that right?

A. Yes.

Q. Will you then go to the second sheet and explain the examples shown there, or a few of them?

A. Well, the dates of arrival at El Paso are indicated in column A; the identification of the train is indicated in column B; and the arrival time at El Paso is indicated in column C. Columns B and C relate to the actual performance; then column D indicates the identification of the redispatch train.

Q. Is that the corresponding train shown in column B?

A. Yes.

Q. These are rather perishable blocks than trains, are they?

A. That is right. Then column C indicates the arrival time at El Paso of the redispatched train, and columns F, G and H are computations, or observations made as a result of the comparison of columns C and E. For instance, in [fol. 3302] the first line the redispatched train arrived in El Paso in advance of the time that the actual train arrived by the amount indicated in column F. The second and third trains arrived at El Paso at the times indicated in column C, but on the redispatch the perishable blocks Y257 and Y258 arrived at El Paso as one train at the time indicated in column E. The comparison between arrival times then of the two trains actual against the one train redispatched is shown in column F; the first train arriving somewhat in advance of the second train resulted in the differences as shown in column F.

Q. Do I understand that in the redispatch where you show these parentheses following the block identification, that two blocks which moved in separate trains in actual operation moved in one train in the redispatched operation as they arrived at El Paso?

A. Yes, the parentheses indicate when that occurs.

Q. And where you have a single arrival time at El Paso of two blocks indicated by parentheses that aga indicates

that the blocks were consolidated into a single train for the [fol. 3303] purposes of the operation into El Paso?

A. That is right.

The Court; Were any of these operations over the south line through Douglas?

A. No, sir. I have been discussing those blocks which arrived in El Paso in advance of actual performance. Column G contains instances when the redispatched trains arrived in El Paso later than in actual performance, and column H indicates instances when the redispatched and actual trains arrived at El Paso at the same time, and when that occurs the word "same" is used.

Mr. Mason: Then, in obtaining the summary on the first sheet, did you first of all count from the actual train sheets the number of trains which were moved?

A. Yes.

Q. With perishable or manifest sections in them?

A. That is right.

Q. And likewise count the number of redispatched trains which carried the same perishable or manifest sections?

A. That is right.

Q. Those are the figures appearing in lines 1 and 2 in each of the blocks June and August, 1938, in the sum[fol. 3304]mary?

A. Yes. The amount of consolidation that was performed is evident from the difference in figures in lines 1 and 2.

The Court: What do you mean by "Ice House Arrival" on these sheets?

A. The trains arriving at El Paso in June usually went to the ice house where the trains received servicing, which is located about two miles west of the Union Station in El Paso.

Q. And you used that point as the point of destination for the purposes of this study?

A. Yes, and the point of comparison; but in August the ice house was not operated, and arrival time of the trains was taken in the yard at El Paso. In that case the time of arrival is taken from the train sheets for August where it is shown down in the yard. The time of arrival at the ice house in June is taken from the conductor's delay reports.

[fol. 3305] Mr. Mason:

Q. In each case where you make comparisons of arrival times between actual and redispatch, are you comparing arrivals at the same point in El Paso whether ice house or yard office?

A. Yes.

Q. As to line 4 and its subdivisions in each of the blocks on the summary sheet, sheet No. 1, is that a summarization of the information which appears in columns F, G, and H?

A. Yes, that is a count, just an item count of the items indicated in those columns.

Q. Is line 5 and sublines A and B worked out the same way by aggregating the totals of advance or later times, as the case may be?

A. That is right.

Q. How did you arrive at the information on line 6?

A. That is a mathematical computation, dividing the figure in line 5A by the figure in line 4B.

Q. And the same process as to line 7?

A. Yes, that is the division of 5B by 4C.

Q. Do all of these times which are shown in line C and E check against the dispatchers' train sheets or the time returns and delay reports, as the case may be?

A. Yes.

[fol. 3306] Q. How do you obtain the time of arrival at the ice house at El Paso of redispatched trains for which there were no time returns and delay reports?

A. That was a part of the redispatching operation. The dispatcher performing that work set the actual train performance against the redispatch train performance.

Q. He moved these particular redispatched trains which in actual operation had been moved to the ice house before going to the yard and he also moved the redispatched trains with the same blocks in them to the ice house?

A. Yes.

Q. And took his time of arrival at the ice house?

A. That is right.

Q. Are there any particular details of sheets two to six, inclusive, which have not been already referred to which require further explanation? I notice, for example, on sheet No. 3 you show a double cross-reference there. Is

that the same engine failure on the 19th which was referred to in your exhibit No. 222?

A. Yes.

Q. Has the exhibit been compared and checked through [fol. 3307] out?

A. Yes.

Q. Will you say whether or not it is a true and correct representation of the underlying sources?

A. It is.

Q. Have the computations all been checked?

A. Yes, I did that checking myself.

Q. Will you state the purpose of the exhibit?

A. To demonstrate the result of removal of interference in permitting arrivals at El Paso on the redispatch operations in advance of arrivals at El Paso on actual operations.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss:

Q. This time of arrival at the ice house, was the same time allowed the redispatched train in the yard movement as the actual train took or was there a redispatched movement of the train after it arrived in the yard?

A. The ice house is at the west end of the yard, there is no yard movement involved in this.

Mr. Strouss: I was wondering why you use in some instances the yard arrival and in other instances the arrival at the ice house?

A. Depending on whether the actual train went to the [fol. 3308] ice house or to the yard. We sent our redispatched train to the ice house or to the yard according to what had happened in actual performance.

Mr. Strouss: If the arrival shown here is not at the ice house, that means that the train never went to the ice house?

A. Yes.

Mr. Mason: Perhaps you should explain it a little more fully, Mr. Sines.

Q. Is the ice house on the direct line from the west as trains move toward the center of El Paso?

A. Yes.

Q. And a short distance east of the bridges across the Rio Grande River?

A. That is right.

Q. Is it a fact that trains may go either direct to the ice house as they come to El Paso or by-pass the ice house and go to the yard?

A. That is right.

Q. If they go to the ice house direct, they go to the yard later, is that correct?

A. Yes, sir.

The Court:

Q. Mr. Sines, referring to your cover page of exhibit [fol. 3309] No. 227, particularly to line 3 of June operations and line 3 of August operations, I take it from those figures that in your redispatching study it is possible to combine blocks?

A. What has happened there is indicated on the following sheets by the word "Part" and comes about because at Yuma it is necessary to cut blocks in two or more parts sometimes in order to comply with the 70-car limit. On our redispatch operation it was necessary to cut those blocks in parts less frequently. We could take a train as it arrived from California and dispatch it east without cutting a block in two.

The Court: You might clarify the mind of the Court if you would define the term "block." I recall distinctly the testimony with reference to the Phoenix block and the Yuma block and the Colton block, but what I am concerned with now is what constitutes a block as applied to your actual train operation.

A. Blocks originate for our purposes on this southern route at Colton, California, and again at Yuma. Block numbers are given to the train loads of P. F. E. cars departing from Colton and at that time one block number is assigned to all P. F. E. cars in that particular train. [fol. 3310] Thereafter the cars that left Colton on that train are kept track of and traced by means of that block number no matter how many times the block may be broken up.

The Court: I believe that answers the question.

A. The same thing applies to trains that come from the valley into Yuma.

Mr. Mason:

Q. You mean from the Imperial Valley?

A. Yes.

Q. You stated that blocks originate at Colton and Yuma. Your exhibit No. 227 for identification shows also an "A" block. Do you recall the testimony regarding the block from the Salt River Valley?

A. That is right.

Q. They originate at Phoenix, do they not?

A. That is right.

Q. And come into this picture at Tucson?

A. That is right.

Q. Have you an example on sheet No. 2 of the Yuma or Y block being broken up in actual operation on June 9th?

A. The first one indicated by the word "Part" is an example.

Q. Does that indicate that part of Y-276 went with Y-275?

[fol. 3311] A. Yes.

Q. And the other part with Y-277?

A. That is right.

Q. Whereas in redispatch operation the Y-276 was not broken up at all?

A. Yes. A moment ago I said sometimes it was necessary to break them up to comply with the law but there is an instance, the first one, of where in order to fill the train out to 70 cars it was necessary to cut the block in half, to cut 276 in half. That filled Y-275 out to near 70 cars, but then the part of Y-276 that was left over went forward with Y-277, filling that train up.

Mr. Booth:

Q. What happened on the redispatch on that block?

A. That block was not broken up on the redispatch but went forward intact with block Y-277.

The Court: The term "block" is only used as applied to perishable products?

A. That is right.

Q. And all of the cars containing perishables that are made up into one train at these points that you have heretofore indicated constitute a block?

A. Yes, sir.

[fol. 3312] Q. And is given a specific number so that any car of perishables from that original train carries that number on through to its destination?

A. That is right.

[fol. 3313] Mr. Mason: Mr. Sines, does the breaking up of these blocks into parts in order to move on separate trains, as you indicated, involve additional switching at Yuma or any other point where the break-up may occur?

A. Yes, that requires more switching than would otherwise be necessary.

Mr. Mason: Are there any further questions from the Court?

The Court: No.

Mr. Mason: We offer the exhibit No. 227 for identification in evidence.

Mr. Strouss: The same objection as to Exhibit 221, it is immaterial, calls for the conclusion of the witness, purely speculative.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 227.")

Mr. Mason: Have you an exhibit before you now, Mr. Sines, bearing the title "Arrival Time at Yuma, Arizona, of 'SSW' and 'GBW' Westward Manifest trains—Actual Operation Compared with Redispatched Operation, With No Restriction and Using AC Power and Long Sidings, Months of June and August, 1938."

[fol. 3314] A. I have.

Q. Being in four sheets?

A. Yes.

Q. Did you prepare this exhibit or cause it to be prepared?

A. It was prepared under my direction and supervision.

Q. And from what sources was it prepared?

A. From the actual and redispatched train sheets.

Q. Were the conductors' time returns and daily reports used?

A. Not in this exhibit, because we have the arrivals at Yuma indicated in all instances on the train sheets.

Q. Was this exhibit prepared in the same manner and along the same lines as Exhibit No. 227?

A. Yes.

Q. And, I take it that this relates to the westward movement of identified or scheduled trains in the same manner as No. 227 relates to the eastward movement?

A. That is right.

Q. There are no ice-house or other arrivals except at the destination or the yard office at Yuma involved here? Are there?

[fol. 3315] A. That is all.

Q. I take it that the first sheet is a summary sheet of the same type as the first sheet of exhibit 227 and that the details are shown on sheets 2, 3 and 4?

A. Yes.

Q. Will you go to sheet 2 and take an example on that sheet and explain just what was done.

A. The arrival time of the first train is shown in column C and the date of arrival is shown in column A. The identification of the train is shown in column B; the same identification appears in column D, and the arrival of the redispatched train is indicated in column E. The actual and redispatched trains arrived at Yuma at the same time, which fact is indicated by the word "same" in column H. On that same day the GBW arrived at Yuma on the actual and redispatched at different times, and the result of that comparison is given in column G. In column F, the fourth train, we have an example of a train arriving at Yuma at different times on actual and redispatched, with the redispatched arrival in advance of the actual arrival. Consolidations on this exhibit are indicated again as they were on the previous exhibit, 227, and the computations were [fol. 3316] performed in exactly the same manner as the previous exhibit 227.

Q. The totals and averages in lines 5, 6 and 7 are worked from the proper columns of sheets 2, 3 and 4 in the same way?

A. Yes.

Q. Will you state the purpose of this exhibit?

A. The purpose of this exhibit is to indicate what the removal of the interference of the Arizona Seventy-Car Limit Law would permit in the way of early arrivals at Yuma to westbound manifest trains.

Q. Has the exhibit been compared and checked against the underlying sources?

A. It has.

Q. Will you say whether or not it is true and correct?
A. Yes.

Mr. Mason: Have you any questions?
Mr. Strauss: No.
Mr. Mason: Has the Court any questions?
The Court: No.
Mr. Mason: We offer the exhibit in evidence as No. 228.
Mr. Strauss: The same objections as to the previous exhibit.
[fol. 3317] The Court: I will overrule the objection. It may be admitted.

(Thereupon the document referred to was received in evidence and marked "Defendant's Exhibit No. 228.")

The Court: Now, Mr. Sines, do you have any perishables going west? I mean under these operations in June and August?

A. No, I don't suppose we have a western perishable movement of any volume at all.

Q. You use the expression "blocks" here. Now, in your westward movement, I thought I understood you, that that only applied to the perishables?

A. Well, I suppose that that is because the word "blocks" is shorter than using the term "manifest section."

Q. Well, then the term "block" is not exclusively applied in railroading to the perishables?

A. Well, about 99 per cent of the time it is, your Honor. They have the same significance, however, both the word "block" and "manifest section" in that it involves a group of cars as to which particular attention is being paid regarding schedule performance and keeping track of the progress of the cars in those blocks or sections.

The Court: Well, now, if you had a train load of empty refrigerator cars going west, would you term that a block [fol. 3318] or a manifest?

A. That would be neither a block nor a manifest, that would just be a drag. The PFE Company just keeps track of the movement of their loaded cars in blocks.

The Court: You may proceed.

Mr. Mason: Generally speaking, Mr. Sines, blocks and manifest sections which are treated on exhibit 228 are the

loads moving west under schedule in the manifest trains, are they not?

A. That is right.

Q. This does not undertake to treat of the movement of westbound empties?

A. No.

Q. As such?

A. No.

Q. I will ask you to refer, if you will, please, to a statement in one sheet entitled "Redispatch Study Wage Data?"

A. Yes.

Q. "Yuma, Arizona to El Paso, Texas for Period June and August, 1938."

A. Yes.

Mr. Mason: May we have this statement marked defendant's Exhibit 229 for identification?

The Court: It may be marked.

[fol. 3319] The Clerk: Defendant's Exhibit 229.

Mr. Mason: Did you prepare or supervise the preparation of this exhibit, Mr. Sines?

A. I supervised the preparation of the exhibit and assisted in a large part of it.

Q. From what sources was it prepared?

A. The information in columns A, B, and F was taken from the white work sheets A, and the information in columns C, D, E and G, G, H, I, was taken from the white work sheets A, information shown in columns J, K, L are computations of the figures in columns C, D, E, and G, H, I.

Q. Now, those lines which are identified severally throughout the exhibit as saving for a period, or increase for a period, are those computations subtractions from the lines immediately above them?

A. Yes.

Q. Now, getting at the basic and variable wages actually paid to trainmen and enginemen, I take it those were from the white work sheet A entries explained by Mr. Garverick?

A. That is right.

Q. Which in turn were taken from the time returns and delay reports rendered by the conductors or engineers?

[fol. 3320] A. Yes.

Q. As to the basic wages for the redispatched trains for trainmen and enginemen, those again were entered on the white work sheets A, were they?

A. Yes, the basic wages.

Q. How did you arrive at the variable wages so called here?

A. The variable wages were treated as lump sums and are computations based upon the percentage reduction and train-miles actual against redispatched, with the exception of certain continuing items which we knew would continue at the same volume without relation to length of trains, such items as station switching at Gila, which is done by road crews, and station switching at Lordsburg, which is done by road crews, and which is not affected one way or the other by length of trains, were continued at the same level; but other items involving overtime, initial switching, terminal switching, and held-away-from-home terminal time, were reduced in the ratio of the train-mile reduction.

Q. Those items vary with the amount of the train-service performed measured in train-miles?

A. Yes, with the opportunities for their accumulation. [fol. 3321] Then, I take it, referring to the Yuma-Gila block, that the amount of variable wages shown for trainmen for the redispatched represents the relationship of the redispatched train-miles to the actual train-miles, and bears the same proportion to the variable wages for the actual operation as the redispatched train-miles do to the actual train-miles, subject to the explanation that you made as to the continuing level of the amounts paid for station switching at Gila?

A. That is right, and Lordsburg.

Q. Well, Lordsburg wouldn't be involved in the Yuma-Gila block?

A. That is right.

Q. And the same explanation would apply to the reduction of variable wages for enginemen from the figures shown for the actual and the figures shown for the redispatched?

A. Yes, and there the computation is based on locomotive-miles.

Q. In the case of enginemen, the computations are based on locomotive miles?

A. Yes.

Q. As shown in column F?

A. Yes.

[fol. 3322] Mr. Mason

Q. Now as to the figures in block VI, total North Line, are those simply the additions of the figures appearing above for each of the separate blocks?

A. That is right.

Q. These totals of basic variable and total in columns J, K, and L, are those cross-totals as well as vertical totals?

A. Yes, sir.

Q. Do you bring the total showing for both North and South lines together?

A. In block XI.

Q. That represents in block XI the totals for the actual and the redispatch operations for both lines and the differences between the two in the line identified as "Saving for period"?

A. That is right.

Q. What operation is undertaken in obtaining the figures in block XII?

A. We expanded the two months' showing to an annual basis using the ratio indicated, whose derivation is shown in the block at the bottom of the sheet.

Q. That is, you obtained the figure for the year by comparing the total traffic in gross ton-miles for the two months with the total traffic in gross ton-miles for the year?

[fol. 3323] A. Yes.

Q. I think you have explained these figures before in connection with the previous exhibit, No. 226. Are these the same figures which appear in the block on the second page of exhibit No. 226?

A. They are.

Q. Are these the same figures of trains, train-miles, and total locomotive-miles which appear on that exhibit?

A. Yes.

Q. How do you arrive at the figure shown in line 13?

A. During 1938 the combined railroad retirement and unemployment insurance tax rate was 5.75 per cent, but those percentages apply to salary payments only up to $300 per

month. Over that there was no tax so we investigated a considerable number of payments to trainmen and enginemen—I just forget how large a volume of figures we worked with—and developed that for trainmen the combined retirement and unemployment insurance tax was 5.65 per cent instead of 5.75, the one-tenth of one per cent difference being due to the fact that some of those trainmen received more than $300 per month.

Q. And the excess over $300 per month was exempt from [fol. 3324] tax in this case?

A. That is right. A similar computation was made for enginemen and there were more enginemen getting over $300 a month than trainmen so it brought that percentage down to 5.44.

Q. Do I understand that the application so far as conductors and trainmen are concerned of 5.75 per cent on the total compensation up to $300 in any one month is equivalent to the application of 5.65 on the total compensation including that above $300 a month?

A. That is right.

Q. That is how you got this figure?

A. Yes.

Q. A similar explanation would be correct as to the 5.44 percentage figure for enginemen?

A. Yes. Then we applied those percentages in columns E and I and added them to the saving figure in block XII to produce the grand total saving in line 14.

Q. Are all of the figures of wage payments shown on the exhibit down to and including block XII exclusive of these Federal taxes?

A. They are, because they are not shown nor computed on the time returns and delay reports. That is done after the timekeeping is done on the paycheck and it is done in [fol. 3325] lump sum computation just as it is on this exhibit here.

Q. Does the company pay this tax to the Federal government or to the railroad retirement board as a lump sum payment on its entire payroll exclusive of compensation of over $300 per month to any one person?

A. I am sorry, I don't know just how we handle that after we get past the timekeeping stage.

Q. Will you say whether or not it is a Federal payroll tax paid by the company?

A. Yes, it is.

Q. And is in addition to the wage payments and not deducted from them?

A. That is right.

Q. Do you know and, if so, will you state whether there is in addition a deduction from the wage payments made for account of each employee and paid directly to the Federal government?

A. That is right, each employee makes a contribution to those funds also.

Q. To the retirement fund but I think not to the unemployment fund?

A. You are right.

Q. That is not included in this account at all?

A. No.

[fol. 3326] Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: Not at present.

Mr. Mason: Has the exhibit been carefully checked, Mr. Sines, with the underlying sources?

A. It has.

Q. Have the computations been carefully checked?

A. They have.

Q. I take it that line 12, column L, represents the amount of monetary payments of wages to employees which would be saved on the annual basis as computed here and that the figure in line 14, column L, represents the total of payments for account of wages and payroll taxes on those wages which would be saved by the company under the circumstances contemplated by this exhibit?

A. That is right, yes.

Mr. Mason: Has the Court any questions?

The Court: No questions.

Mr. Mason: We offer it in evidence as defendant's exhibit No. 229.

Mr. Strouss: The same objections as to the previous exhibits.

The Court: Objections overruled, it may be admitted.

(The document referred to was received in evidence and [fol. 3327] marked "Defendant's Exhibit No. 229.")

The Court: Mr. Sines, for the moment referring to that same exhibit, in column A, if I recall the previous testimony,

you are taking a train from Yuma to El Paso through the four divisions or districts indicated, which would be classed as four trains rather than one train?

A. That is right.

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows:)

Mr. Mason:

Q. Mr. Sines, have you a statement in one sheet entitled, "Los Angeles, California, to El Paso, Texas, Passenger Redispatch Study for the Year 1938," etc.?

A. Yes.

Mr. Mason: May we have this exhibit marked as "Defendant's Exhibit No. 230" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 230 for identification.

Mr. Mason:

Q. Did you prepare this exhibit, Mr. Sines?

A. Yes.

Q. From what sources?

[fol. 3328] A. From the white work sheets A which were used to make the passenger redispatch studies for the year 1938.

Q. Does this cover the entire year 1938?

A. It does.

Q. What does this reflect as to passenger train operations during the year 1938?

A. It indicates the additional and extra passenger train service which we determined was brought about by observance of the Arizona 14-car limit law.

Q. Contrasting the passenger train redispatch study with the freight redispatching study, why is it you are able to make the study of the entire year according to the appearance of the exhibit comparatively much more simply and easier than in the case of the freight redispatching study?

A. In the case of a passenger redispatching study it is much easier to indicate what would have been done if the 14-car limit law had not been operative. For instance, take the simplest example, a train comes to Yuma with 15 cars none of which can be set out but which must move forward

on the schedule of that train. It is then necessary to provide a second or extra section to handle that one car to its destination if it be in Arizona or across the state to Lordsburg if it be east of Arizona. It is very easy to say if there had not been a 14-car limit that train could have gone through Arizona handling 15 cars and we could point our figure accurately and exactly at that extra section and say "That is the train which would have been eliminated," but with a freight redispatching study where a day's business is handled in fleets of trains, fleets of six, seven, eight, or nine trains per day, all of those trains observing the 70-car limit and their redispatching that business in a fewer number of trains, it is impossible to point your figure at any one train and say "This is the train that would have been eliminated." All you can do is say that the actual operation amounted to nine trains and the redispatch operation amounted to six or seven trains, and there would have been saved two or three trains; and you get at the difference by subtraction instead of by actual determination.

The Court: You don't mean to infer from that that in actual operations where you might bring 15 cars to Yuma from Los Angeles that you would actually run a separate section of that train across the state with only one car?

A. Yes.

[fol. 3330] Q. That is actually done?

A. Yes, sir.

Mr. Mason:

Q. In actual practice, Mr. Sims, if you had 15 cars, would you run two sections of eight and seven or something like that instead of fourteen and one?

A. In the year 1938 I have known where both occurrences happened. We handled one car in our extra section and fourteen cars in the regular section. The reason for that is you cannot take one Pullman car and take it away from the diner because you have to feed your passengers. You cannot take an observation car off a train very well because you have advertised to the passengers that they are going to have an observation car to use, so you will take a head-end car with mail or express that has to move on that schedule or that has the passengers' baggage and other equipment in it and you make a train out of that head-end car. On a short trip where they don't need a diner you might run

a two car train with a passenger car and a buffer. In that event it means you are subjecting yourself to the additional expense of hauling that additional buffer car.

Q. Referring to exhibit No. 230 for identification, will you take some of these examples and explain just what you have [fol. 3331] done here?

A. All of these examples are listings of the second and extra sections of the trains identified in column A which were determined by means of our study would be necessary to run.

Q. Taking the first example, was there an extra section of train No. 2 operated from Yuma to El Paso via Phoenix and Bowie?

A. There was.

Q. Which made the number of train-miles shown?

A. Yes.

Q. By your study with the dispatchers' actual train sheets and the white work sheets, you determined that that train extra section could have been eliminated?

A. Yes, because of the increased number of cars which would have been handled from Tucson east to Lordsburg, we would have provided a helper for that larger train out of Tucson and incurred the additional expense indicated in column F in order to eliminate the necessity for an extra train the entire distance across the state.

Q. In other words, the locomotive-miles in column F identified with the letter "O" are light and helper miles which would have been run on the consolidated train which were [fol. 3332] not run on the two separate trains within the 14-car limit?

A. That is right.

Q. And are an offset against any saving of locomotive-miles that would have been made by running one instead of two trains?

A. That is right.

Q. Do you get the total in column G by subtracting the figure in column F of the line representing train No. 2 from the total locomotive-miles shown in column E for that particular train?

A. That is right.

Q. And the same way as to the second one?

A. Yes, occasionally, or it is more often than occasionally, in running these additional or extra sections we run one more train in one direction or one more train than we have

scheduled as an everyday occurrence in one direction than we do in the other direction and that means that we have to balance passenger engines and the engine crews and the passenger train crews in the same manner as we have described for freight operations in order to get them over to the point where they will be required for service or return them to their home terminals after they have completed their service. In that event, by eliminating this extra section we have also eliminated the necessity for paying these crews [fol. 3333] for the dead-head movement in the case of the train crews and the double-head movement in the case of the engine crews and we will also eliminate the locomotive mileage in both directions even though the train itself only sees service in one direction. The additional locomotive-miles over and above the locomotive-miles during which time the locomotives are handling the train are indicated in column F also.

The Court: Do I understand you to say in your normal operations now there is an unbalance of both power and men due to the fact there is a greater movement in one direction of passengers than there is in the other?

A. Did you say "normal"?

The Court: Yes.

A. No, the normal situation is that we have four passenger trains in each direction through Arizona each day.

The Court: What did you mean when you referred to an unbalance?

A. When we run one additional train in one direction, we then have five passenger trains in one direction and four passenger trains in the other direction.

The Court: And that is what creates the unbalance?

[fol. 3334] A. These additional and extra sections caused by the Arizona 14 car limit law.

Mr. Mason:

Q. You mean where an extra section of a train is run because you have fifteen or sixteen cars in one direction and only fourteen in the other on some particular day or pair of days?

A. Yes, under the circumstances I have described.

Q. And the circumstances studied in exhibit No. 230?

A. Yes.

The Court:

Q. However, if it happens that on that same day in the opposite direction you also had a long train, there wouldn't exist this unbalance that you mention?

A. Not necessarily, that is right.

[fol. 3335] Mr. Mason: If your eastward long train happens to be moving over the south line, and the westbound long train happens to be moving over the north line, you would have a double unbalance, wouldn't you, Mr. Sines?

A. That is right.

The Court: We are now getting into the theoretical.

The Witness: No, you are talking about actual conditions that we have to meet every day, and it also depends, to some extent, upon seasons. During the Christmas season we will have long trains or extra sections running in both directions which will cancel out.

The Court: With your passenger trains, Mr. Sines, running from Yuma to El Paso, do you count that as one train, or do you count it as you do your freight train, one train for each division or district through which it operates?

A. I didn't attempt to define that, your Honor. I just said that that happened so many times.

The Court: Well, I undersand that this exhibit doesn't refer to it, but I am asking you now, in the other exhibits let us say that may be in evidence here, how was it designated, the passenger trains, or do we have any such?

[fol. 3336] Mr. Mason: We have such an exhibit; yes, the exhibit No. 220 has a train count on it.

The Witness: There are no passenger trains on there, are there, 220? Yes, you are right, and in that event the passenger trains on exhibit 220 have been counted once on each freight district.

Mr. Mason: In the same manner as the freight trains were counted?

A. Yes, but as far as any passenger studies are concerned, I have not identified them as trains by any kind of an arbitrary count.

Q. I should like to have you, on exhibit 230, explain this offset of 150 motor-car-miles. How does that come about?

A. That is indicated by the note alongside of the item at the bottom of the sheet and was brought about by elimination on our redispatch of a section which operated through Phoenix, but which had some Phoenix passengers on it.

Q. You say operated through Phoenix?

A. Yes. When we took the train off through Phoenix, it meant that the equipment went through Gila. In order to get those passengers up to Phoenix we said, "We will run a motor car down to Picacho to pick them up and take them to Phoenix."

Q. And that accounts for the 75 miles of motor car oper- [fol. 3337] ation light from Phoenix to Picacho, and loaded from Picacho to Phoenix?

A. Yes, sir.

Q. Mr. Sines, as I recall it, your passenger operations as distinguished from your freight operations, that your 1938 redispatching study as well as the actual operations for the passenger cover the entire year, whereas for the freight it only covered the months of June and August?

A. That is right.

Mr. Strouss: I didn't understand where that motor car operation appeared in there.

A. The note at the bottom, and it doesn't appear in any of the totals above there.

Mr. Mason: Have you any other comments on this exhibit, Mr. Sines, prior to its offer?

A. No.

Mr. Mason: Have you any further questions, Mr. Strouss?

Mr. Strouss: I was trying to see where this is different from Exhibit 199.

Q. Exhibit 199 would include this, but in addition, other interferences?

A. Yes, sir. This information on 230 is an operating statistics exhibit to develop the quantities necessary to make an estimate of the money which could have been [fol. 3338] saved, but the other exhibit that you speak of, No. 199, is an interference exhibit.

Q. Now, what is this item, "Indio Helper Service?"

A. When the two trains, 43 and 5, operate through Tucson westbound, either one of those trains would have more than fourteen cars west of Tucson or either one of them would pick up west of Tucson so as to increase their consist over fourteen cars if it were permissible. It is the practice to take the cars off one train and put them on the other train if the second train has available space under the fourteen car limit to permit it. We reroute the cars and reassign the cars to the other train. This may mean that both trains will leave Tucson with fourteen cars and that they will go through to Yuma with fourteen cars. Now, operating west from Yuma to Los Angeles, it is our practice to furnish helper service for passenger trains of over ten or eleven cars——

Mr. Mason: Between what points westward?

A. Between Indio or Garnet and the top of the hill at Cabazon.

Q. Banning?

A. Banning.

[fol. 3339] Q. Is that the Beaumont grade?

A. Yes.

The Court: Is that to enable them to maintain their schedule?

A. Yes.

Q. The locomotive could pull the train but not maintain its schedule, or is that a matter of contract with the brotherhoods?

A. Oh, no; I don't know whether they could get up there with fourteen cars or not, but it assists in maintaining schedule, yes. We don't reswitch those trains at Yuma because of the time and inconvenience that would be necessary, but let both those fourteen-car trains go over to the bottom of the helper grade, and then it means that both those trains will have to have a helper to assist them up the hill. Now, if it had been possible originally at Tucson to permit one train to go out with ten or eleven cars and the other train to go out with fifteen or sixteen cars, only one train would have required the helper, and the other train could have gone single. We had several instances in 1938 where both trains, under the circumstances I have de-

scribed, required helpers but where reconsisting the trains made it possible to eliminate the helper on the second train, [fol. 3340] and we have accounted for that on this exhibit.

Mr. Strouss: No more questions.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit 230.

Mr. Strouss: The same objection as to the previous exhibits.

The Court: The objection will be overruled. It may be admitted in evidence.

(Thereupon the document referred to was received in evidence and marked "Defendant's Exhibit No. 230.")

Mr. Mason: Have you before you, Mr. Sines, an exhibit in one sheet entitled "Los Angeles, California, to El Paso, Texas, Saving in Passenger Train Service and Costs Account Discontinuance of Fourteen Car Limit on Passenger Trains in Arizona, Year, 1938?"

A. I have.

Mr. Mason: May this be marked Exhibit 231?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 231 for identification.

Mr. Mason: From what sources was this exhibit prepared, Mr. Sines?

A. This was prepared from information shown on Exhibit 230 as to train and locomotive-mile savings and I [fol. 3341] have applied against those mileage the costs shown in our form 521 for passenger service for the year 1938, as to items in 3D, 3E, and 3F, the items of fuel, enginemen's wages and trainmen's wages is taken directly from the reports regularly made as the result of the operation of those trains. A special computation was made with respect to the fuel item to separate the fuel consumed by the engine as contrasted with the fuel consumed by the trailing load.

Q. And are all these computations either taken directly from the reports of the wages or, as the case may be, from form 521?

A. Yes.

Q. The figures I notice for fuel and so forth, particularly for fuel, rather, between Los Angeles and Yuma are

different than those between Yuma and El Paso. Is that because of a difference in the figures reported in form 521?

A. Did you say the fuel?

Q. Yes.

A. Well, that is because I had the fuel separated by the Fuel Bureau at Yuma to give me the fuel consumed by trains west of Yuma and the fuel consumed by trains east of Yuma and then after I made the split of fuel between [fol. 3342] locomotive and trailing load, the fuel consumed per locomotive-mile was greater west of Yuma than it was east of Yuma.

Q. Then that accounts for the difference in unit cost between the districts west of Yuma and east of Yuma?

A. That is right.

Q. Now, this is entirely addressed to the train or locomotive miles saved rather than in comparison with the total operated and the total which would have been operated?

A. That is right. An explanation should be made with respect to the cost of gasoline motor car operation, the expense figure indicated there in line 8 comes from a statistical statement prepared by our accounting department covering the cost of operation of motor cars similar in form and substance to the form 521. I have a copy of that motor car statement here, which I can give Mr. Stronss.

Q. This is simply a unit cost developed in the same fashion as the unit costs which are developed on form 521?

A. Yes.

Q. And all of these unit cost figures relate to the forms 521 for the year 1938, do they?

[fol. 3343] A. Those which I have mentioned, except 3A, 3B and 3C, which are direct segregations.

Q. Has the exhibit been compared against these underlying sources to determine its correctness?

A. Yes.

Q. Are there any other computations other than those which appear on the face of the exhibit which you have not already explained?

A. Well, yes. There is especial consideration given to the out-of-pocket cost feature from this viewpoint: The cost of fuel, enginemen and trainmen items is charged out at 100 per cent of its value, engine house is charged at 43 per cent of the unit cost figure shown on form 521, other locomotive supplies are charged at 100 per cent, and locomotive repairs are charged at 80 per cent. The reasons for

reducing the engine house and locomotive repairs to percentages less than one hundred is that in eliminating occasional operation such as this, the expense of supervisory forces and some of the labor expense will continue even though the locomotive-miles themselves be reduced. We won't cut down our foreman's expense, for instance, in the roundhouse because we don't operate a particular passenger train.

Q. The same way as to locomotive repairs, there will be [fol. 3344] some stand-by expense which will not be eliminated even though the locomotive-miles are eliminated, occasionally eliminated as you say?

A. That is right, and the percentages that I have mentioned are percentages that we have developed in the Bureau of Transportation Research and which I have used for a number of years.

Q. By charging these expenses at a percentage figure rather than a total of 100 per cent, do you reduce the amount indicated as a saving or do you increase it?

A. I reduce it.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: Yes. I am not quite certain that I understand that 3A, 3B and 3C. 3B and 3C, if I understand you correctly, you have taken the actual figures of wages paid out, actual wages paid out?

A. Yes, to the men manning the particular trains which we say would be eliminated.

Q. Now, in 3A, Fuel, you didn't use the unit cost which you have set up in your form 521?

A. No, we went to our Fuel Bureau and had them give us the amount of the fuel consumed by every one of these particular extra sections.

[fol. 3345] Q. On the particular engines used on those operations.

A. Yes, and that gave us the fuel for the movement of the locomotive and cars. Now, most of these cars would go ahead anyway regardless of the fact that we cut the train off, so, in effect, all that we do is to eliminate the operation of the locomotive and these buffer cars that I speak of, so I made this computation to split the fuel as between locomotives and cars and that is the resulting unit figure that I have shown on the exhibit.

Mr. Mason: That represents the fuel required to move the locomotive apart from the cars?

A. Yes.

Q. You figures that you only saved the locomotive-miles and not the car-miles?

A. That is right.

Mr. Strouss: In other words, in the actual train, if these cars had remained in that train there would have been additional fuel in order to move those cars in the actual train?

A. That is right.

Q. And you have made an allowance here for what that additional fuel would have been in the actual operation, and this then would bring it down to what you consider the [fol. 3346] fuel necessary to move the locomotive alone?

A. That is right.

Mr. Strouss: That is all.

Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 231.

Mr. Strouss: The same objection as to the previous exhibits.

The Court: The objection is overruled. It may be admitted in evidence.

(Thereupon, the document referred to was received in evidence and marked "Defendant's Exhibit No. 231.")

Mr. Mason: Have you a statement before you, Mr. Sines, entitled "Passenger Redispatch Study—Year 1938, Los Angeles, California, to El Paso, Texas, Extra-Territorial Effect of Arizona Train Limit Law between Los Angeles, California, and Yuma, Arizona, and Arizona-New Mexico State Line and El Paso, Texas?"

A. Yes.

Mr. Mason: May we have this statement marked Exhibit 232?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 232 for identification.

Mr. Mason: Did you prepare this exhibit, Mr. Sines?

[fol. 3347] A. I did.

Q. And from what sources?

A: The sources are indicated in the—source blanks are indicated in the body of the exhibit, the information is all taken from the preceding two exhibits, 230 and 231.

Q. You have a blank under block one of this exhibit. What figure should be filled in there?

A. Exhibit 231.

Q. And in the other blanks, what would that be, 230 and 231?

A. Yes.

The Court: At the bottom?

Mr. Mason: At the bottom under the asterisk what would that be?

A. 231.

The Court: You are asking that the exhibits filed with the clerk, that the numbers be inserted that you indicate?

Mr. Mason: Yes.

Q. Now, I take it that the figures under paragraph one are taken directly from the preceding exhibit?

A. Yes.

Q. How do you arrive at the figures in paragraph 2?

[fol. 3348] A. We computed the train-miles indicated on exhibit 230 from the Arizona-New Mexico state line to the end of the train runs shown on the exhibit. For instance, train No. 1 on exhibit 230 operated from El Paso, Texas, to Yuma, Arizona, via Bowie and Phoenix. From El Paso to the Arizona-New Mexico state line would be 171 miles, and that would be included in the figure on exhibit 232 as extra-territorial train-miles.

Q. Was the same detailed computation undertaken in connection with every other item on exhibit 230?

A. That is right.

Q. To obtain the additional train-miles?

A. That is right.

Q. There were no additional light or helper locomotive-miles?

A. Well, I did that from the train-mile basis because these light locomotive-miles don't always match up with the train-miles that are operated, so I stayed with the train-mile basis.

Q. Now, in pricing out these saved train-miles, you show by the asterisk, where are those figures?

A. Those figures come from line 3G, column C, where we find $9,397 as the saving in the territory Yuma, Arizona, to El Paso, Texas, and in line 1 we find 12,712 train-miles [fol. 3349] saved between Yuma, Arizona, and El Paso, Texas.

Q. And you obtain an average figure per train-mile for each train-mile saved?

A. That is right.

Q. And then apply that average figure to the extra-territorial miles that are saved?

A. That is right.

Q. Then I take it that line 3 is simply the addition of the three figures appearing directly above the total?

A. Yes, sir.

Q. Have the computations on the exhibit been checked?

A. They have.

Q. Is the exhibit true and correct as a reflection of the underlying sources?

A. It is.

Mr. Mason: Has the Court any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 232.

Mr. Strouss: The same objection as to the preceding exhibit.

The Court: The objection is overruled. It may be admitted.

[fol. 3350] (The document referred to was received in evidence and marked "Defendant's Exhibit No. 232.")

Mr. Mason: Take up the exhibit in a single sheet entitled "Redispatch Study—Operating Statistics, Tucson—Phoenix Month of December, 1938."

A. Yes.

Mr. Mason: May we have this statement marked No. 233 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 233 for identification.

Mr. Mason: Did you prepare this exhibit, Mr. Sines, or supervise its preparation?

A. I supervised its preparation.

Q. From what sources was it prepared?

A. This was taken from the white work sheets A upon which Chief Dispatcher Cassady of the Tucson Division performed the redispatching study for the month of December, 1938, between Tucson and Phoenix.

Q. Were the original train sheets used in this connection?

A. Yes, the original train sheets were used to determine the actual handling.

Q. Were there any redispatch train sheets compared? [fol. 3351] A. No.

Q. Will you explain why not?

A. The reason for that is that there was one, or at the most two trains per day involved in each direction, and their operation could be indicated with enough detail on the white work sheets A to satisfy the requirements of the redispatching study.

Q. Is this an actual count from the train sheets and the work sheets of the statistics which are shown in columns A to E, inclusive?

A. That is right.

Q. I take it that the computation of cars per train is computed from the exhibit?

A. Yes.

The Court: This exhibit has to do wholly with freight operations?

A. Yes.

Mr. Mason: And this is the separate redispatching study or the result of the separate redispatching study of the Phoenix-Tucson line which Mr. Cassady mentioned in his testimony?

A. That is right.

Q. Will you explain why the month of December was taken, whereas in the other 1938 redispatching study June and August were taken?

A. June and August were the months chosen for the line [fol. 3352] Yuma to El Paso because those are the months which would best measure the maximum and minimum volumes of traffic passing through Arizona from California to eastern destinations, and from eastern destinations to California, and with the exception of December and one or two other months of the year, a very small percentage of

that through business gets up onto the Phoenix line. There are only operated on that line one local train in each direction each day, but during December and one or two other months of the year there is a perishable season in the Phoenix territory and two trains per day are operated out of that territory and sometimes three.

Q. Then did you select the month of December because that represents a heavier month on the Phoenix line?

A. That was the peak month for 1938 on the Phoenix line.

Q. Did the redispatching study indicate and, if so, will you state whether the 70-car limitation operated in any sense as a restriction upon operations during the month of December, 1938?

A. It did operate as a restriction in that it caused us to operate more trains, more train-miles and locomotive-miles than would otherwise have been necessary.

[fol. 3353] Q. Your exhibit No. 233, then, presents the result of that study, of that particular peak month on the Phoenix line?

A. That is right.

Q. Have you undertaken to evaluate this saving beyond presenting merely the amount of the train-miles and locomotive-miles that would be saved by non-observance of the law?

A. No, I have not.

Q. Do I understand that the train sheets and the white work sheets A for the month of December, 1938, have also been supplied to Mr. Strouss?

A. No, they haven't but they have been made available, and are subject to his call at any moment.

Mr. Mason: That was our understanding previously that they would be available upon your call, Mr. Strouss.

Mr. Strouss: Yes.

Mr. Mason: Have you any questions on Exhibit 233, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has the Court any questions on No. 233?

The Court: No.

[fol. 3354] Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 233.

Mr. Strouss: The same objections.

The Court: The same ruling. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 233.")

Mr. Mason: There is a feature of Exhibit 233 which you might explain, Mr. Sines. I notice the reference to the Phoenix Roustabout Service. Apparently, in the redispatching handling, there was an increase in the number of trains. How did that come about? What is the Phoenix Roustabout handling on the redispatched that didn't exist in the actual?

A. In making the consolidation of trains at Phoenix, that is, letting one train do the work that two had done to handle cars from Phoenix to Tucson, it was necessary to eliminate from local work on our redispatched long train between Phoenix and Tucson at stations immediately east of Phoenix, so we had to provide for a Phoenix roustabout to do that local work in the immediate vicinity of Phoenix. That would be quite a saving, however, because the roustabout, as indicated here, would only operate for 61 miles; [fol. 3355] whereas the train eliminated had operated about 120 miles from Phoenix to Tucson.

The Court: Where do you get that 61 miles the roustabout train would operate?

A. Dividing the 254 by 4.

[fol. 3356] Mr. Mason:

Q. You had four trains and you got a total of 254 train-miles?

A. Yes.

Q. A little more than 61, I think, four into 254?

A. All right, 63.

Q. Do you have anything further on exhibit No. 233?

A. No, sir.

Q. I think you have previously spoken of redispatching studies relating to the period in 1940, month of April of that year, when trains were operated on the Tucson division or in the state of Arizona to a certain extent without regard to the 70 car limitation?

A. That is right.

Q. Have you an exhibit showing the result of the redispatching of what may be called for convenience "1940 Long Train Period"?

A. I have.

Q. When I refer to the 1940 long train period, it will be understood that it means the period between April 4th and April 30th, inclusive, 1940?

A. Yes.

Q. First of all, the redispatching study which compares the actual operation of long trains during that period, of [fol. 3357] all trains during that period, with the operations as they would have taken place if the 70-car restriction had been fully observed. Have you an exhibit of that type before you?

A. Yes, sir.

The Court: In other words, we are now about to consider the reverse of what we have been considering up to date?

A. Exactly, we want to determine how much we saved during those twenty-seven days.

Mr. Mason:

Q. This is a case, to carry out the Court's suggestion a little further, this is a case of making short ones out of long ones where heretofore we have been making long ones out of short ones?

A. That is right. This is an exact duplicate of what we did in our Nevada Train Limit study.

Q. I want to refer to your exhibit No. 196. Is the subject matter which we are now approaching with your next exhibit associated with item No. 5 of exhibit No. 196?

A. Yes.

Q. Will you state the title of the exhibit which has just been distributed?

A. "Main Line Freight Trains of Various Lengths Operated between Yuma, Arizona, and El Paso, Texas, via [fol. 3358] Gila, Arizona, and Lordsburg, New Mexico, and via Douglas, Arizona, over South Line during Period April 4th to April 30th, 1940, inclusive, Actual Operation Compared with Redispatched Operation, Observing 70-Car Restriction and Using Present Power and Short Sidings."

The Court: You are waiving any right that this might incriminate the defendant in this case?

A. I am leaving that to counsel.

Mr. Mason: We understand that this is not a criminal prosecution, Judge; we believe it is preferable here to show

the facts. I imagine that the fact of the operation of these trains is not unknown to the Attorney General's office, but for reasons of its own the Attorney General's office chose to refer to only two trains in the complaint.

Q. Did you prepare or supervise the preparation of this exhibit, Mr. Sines?

A. It was done under my supervision and direction.

Mr. Mason: This exhibit, by the way, should be marked No. 234 for identification, if your Honor please?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 234 for identification.

[fol. 3359] Mr. Mason:

Q. From what sources was this exhibit prepared?

A. This was taken from the actual train sheets and the redispatched train sheets supplemented by information taken from the conductors' wheel reports and the conductors' time returns and delay reports.

Q. Has it been compared against the underlying sources which you just mentioned?

A. It has.

Q. Does this exhibit correspond to any exhibit previously presented in connection with the 1938 redispatching study?

A. Yes, it is a counterpart of exhibit No. 214.

Q. This, I take it, is simply a train count by train lengths of the trains as they were operated and as they would have been operated if the 70-car restriction had been complied with?

A. That is right.

The Court: Exhibit No. 214 covered the months of June and August, whereas this exhibit only covers the twenty-six or twenty-seven day period?

A. That is right.

Mr. Mason:

Q. Was this exhibit prepared in exactly the same manner as exhibit No. 214?

A. It was.

[fol. 3360] Q. And from the corresponding sources relating to the long train period of 1940?

A. Exactly.

The Court: There is this distinction though, is there not, between these exhibit No. 214 and No. 234; in fact as I recall it, your entire redispatching study and all of the exhibits that have been offered in connection therewith have been on the assumption that you had suitable sidings and suitable power to operate those redispatched trains?

A. That is right.

The Court: Whereas with exhibit No. 234, the sidings were as they actually exist and I believe you heretofore testified that the length of the period was such that you didn't feel justified in shifting the heavier power onto this line?

A. That is right.

Mr. Mason:

Q. In order to carry the distinction further, Mr. Sines, this is a comparison of operations as they were conducted without regard to the 70-car law but with the power and the sidings which were available in April of 1940?

A. That is right.

Q. As contrasted with operations as they would have been conducted if the law had been observed with the same power [fol. 3361] and the same sidings?

A. That is right.

Q. So that the only difference in the operating conditions as between actual and redispatched is the disregard of the 70-car law?

A. Yes.

Q. Is the exhibit true and correct as a reflection of the underlying sources?

A. It is.

Q. Have the computations been checked?

A. They have.

Q. I take it that the totals are as shown for each of these separate blocks or additions of the figures immediately above?

A. Yes.

Q. You haven't undertaken to present any showing of savings or increased operations, as the case may be, as achieved by the operation?

A. No, this is simply a train length exhibit, although savings are indicated in the totals where comparison may be made between the number of trains actually operated

and the number of trains that would have been operated had the law been observed as shown in the redispatch.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

[fol. 3362]. Mr. Strouss: No questions.

Mr. Mason: Has the Court any further questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 234.

Mr. Strouss: The same objections particularly as to the redispatch.

The Court: The objections are overruled, it may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 234.")

The Court: The court will be at recess until two o'clock P. M.

(Thereupon the court stood at recess until two o'clock P. M., this day.)

[fol. 3363] January 30, 1941, two o'clock P. M.

The witness B. S. Sixes, was recalled to the stand, and proceedings were resumed as follows:

The Court: You may proceed.

Mr. Mason: Your Honor, the question was asked Mr. Sines as to the difference between the freight redispatching study and the passenger redispatching study, particularly as to the determination of the trains eliminated, and because his answer seemed at the time incomplete, we have had it written up to determine whether it read as we thought it read. I would like to have that answer made more complete. I think in your answer this morning, Mr. Sines, as it has been recorded, you said that "with a freight redispatching study where a day's business is handled by fleets of trains, fleets of six, seven, eight or nine trains per day, all of those trains observing the 70-car limit and then redispatching that business in a fewer number of trains, it is impossible to point your finger at any one train and say, 'This is the train that would have been eliminated.' All you can do is say that the actual operation amounted to

nine trains, and the redispatch operation amounted to six or seven trains, and there would have been saved two or [fol. 3364] three trains; and you get at the difference by subtraction instead of by actual determination." And there the quotation ends. Now, do you mean that you don't make an actual determination in the freight redispatching study, or simply that you don't make an actual determination of any specific or individual train to be eliminated?

A. The latter is my contention, that we don't determine the specific individual train eliminated.

The Court: Well, the Court so understood it.

Mr. Mason: Whereas, in the passenger redispatching studies, you eliminated an actual and specific train?

A. Yes.

Q. Now, refer to your exhibit 234 again. I think that you said, prior to the noon recess, that it was possible by reference to the exhibit to determine what the additional operation would have been if the law had been observed even though the precise figures of additional train operation in the sense of train-miles may not appear on the exhibit?

A. Yes.

Q. Can you point to the showing on the exhibit which you had in mind?

A. The total for the territory, Yuma to Gila indicates [fol. 3365] 377 trains actually operated and on the redispatch 399 trains, an increase of 22 trains in that particular district. The grand total, trains between Yuma and El Paso, indicates 1,550 trains actually operated as compared with 1,614 trains which would have been operated according to our redispatching study, an increase of 114 trains.

Q. Now, I notice that between Yuma and Gila there were actually operated eastward 175 trains, and westward 202. Does that indicate an unbalance of trains?

A. Yes, there were 27 more trains operated westbound than eastbound, which would have required the double-heading of locomotives and deadheading of train crews in the opposite direction to balance the power and crews.

Q. That was in actual service, was it?

A. Yes.

Q. Now, was that an actual requirement rather than a potential requirement?

A. That was an actual requirement.

Q. Now, what do we find on the redispatching study as to the unbalance?

A. On the redispatching study under the 70-car restriction, we go further out of balance, we find that there were [fol. 3366] 47 more trains westward than eastward.

Q. Does a similar condition appear in some of the other districts?

A. Yes, Gila to Tucson, actually there were 24 more trains westward than eastward, and on the redispatch there were 44 more trains westward than eastward. Similar differences prevail between Tucson and Lordsburg, but between Lordsburg and El Paso there was no change indicated as a result of the redispatching study.

Q. There was substantially the same operation, generally speaking, between Lordsburg and El Paso in the redispatch as in the actual, was there?

A. That is right.

Q. The figures, of course, here would indicate precisely what the differences were?

A. Yes, sir.

The Court: Then, Mr. Sines, in your recapitulation of your redispatch in the territory from Yuma to El Paso, the 107 trains of over seventy cars, all of those operated between Lordsburg and El Paso paying due respect to the Arizona law in the redispatched operation?

A. That is right. That can be quickly checked.

The Court: I see that can.

[fol. 3367] Mr. Mason: Have you any other comments on exhibit No. 234?

A. No, I don't think so.

Q. Have you before you a chart in one sheet entitled, "Relative Train Lengths, Arizona, California, New Mexico, Texas, Through and Local Freight Trains Operating Via Yuma, Gila, Tucson, Lordsburg, and El Paso, Based on Redispatching Study of April, 1940, Observing 70-Car Restriction and Using Present Power and Short Sidings"?

A. Yes.

Mr. Mason: May this be marked "Defendant's Exhibit No. 235" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 235 for identification.

Mr. Mason:

Q. Is this likewise based on the redispatching study, item No. 5 of your exhibit No. 196?

A. It is.

Q. And prepared under your direction?

A. Yes.

Q. What is the source of the figures shown on the exhibit?

A. Data abstracted from the actual and redispatched train sheets.

[fol. 3368] Q. As to the territory west of Yuma, is that one especially prepared in the office of the auditor of equipment service accounts?

A. Yes, for the 27 day period, April 4th to April 30th, 1940.

Q. Did you consolidate the trains entering Yuma from the west so as to include those coming from the Imperial Valley direct as well as those coming from Indio via Niland?

A. That is correct. There are shown hereon trains entering Yuma from the west and trains departing Yuma to the west.

Q. Is this exhibit a counterpart of exhibit No. 215?

A. Yes.

Q. This exhibit is a showing similar in its general aspects to exhibit No. 215, is it?

A. Yes.

Q. Has it been checked against the underlying sources?

A. It has.

Q. Will you state whether it is true and correct?

A. It is true and correct.

Mr. Mason: Have you any questions, Mr. Strouss?

[fol. 3369] Mr. Strouss: No questions.

Mr. Mason: Has the Court any questions?

The Court: No.

Mr. Mason: We offer the exhibit as defendant's exhibit No. 235.

Mr. Strouss: Same objections.

The Court: Objections overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 235.").

Mr. Mason:

Q. Mr. Sines, I notice from exhibit No. 235 that the cross-hatching appears only or practically only in connection with

the westward operation. There is apparently very little difference between the average actual trains and the average redispatched shorter trains for the eastward operation. Will you explain why that is?

A. Because the preponderance of traffic during April, 1940, was westward and we brought the westward train operation more nearly into balance with the eastward operation by lengthening our westward trains. We did run a few long trains eastward but not to the same extent that we did in the opposite direction.

Q. Was it necessary in the 1940 long train operation to [fol. 3370] observe siding clearance, generally speaking, one way or the other?

A. Yes, that was a further handicap that had its reflection in the results of that long train operation in April, 1940. We still had to observe siding clearance generally with the trains in one direction and on top of that we couldn't add appreciably to the length of our eastward trains with the power that we had available at that time.

Q. By referring to the preceding exhibit, I notice that between Yuma and Gila there were 77 westward trains having 71 or more cars but only 12 eastward trains. Is that condition reflected on the Yuma-Gila district as it appears on exhibit No. 235?

A. Yes.

Q. Do I understand you to say that is because of an unbalance of traffic as measured in car-miles westward?

A. Yes.

Q. As against the eastward traffic?

A. Yes.

The Court: Mr. Sines, referring back for the moment to exhibit No. 234, I notice in the upper block the operations from Yuma to El Paso over your northern route there was an actual saving in your long train operation as against [fol. 3371] your redispatched when you complied with the Arizona law of some 64 trains, whereas in the lower block, your southern route, apparently you ran exactly the same number of trains in your actual operations where you paid no attention to the restrictions of the Arizona law as you did in your redispatch?

A. That is right.

Q. Will you explain that? How you would affect the saving in one instance and not in the other, I mean a saving in the number of trains?

A. Yes. The situation on the South Line via Douglas was the same in 1940 as it was in 1938, we were running one train a day in each direction and——

Mr. Mason (Interrupting): You mean one through train in each direction, I take it?

A. It has a connection at Douglas, but it is not a through train. They do local work down there.

Mr. Mason:

Q. What I had in mind was exclusive of the Douglas-Bisbee service?

A. Yes. We couldn't cut any trains out on the South Line by consolidation or elimination. We always have to run the one train.

The Court:

Q. If you only had one train a day each way, that would be two trains operated daily and you have two districts so [fol. 3372] you would have double that, that would be four, and four times the twenty-six days that you operated would be 104, whereas you actually operated 176 trains so that there was more than one a day each way during that 27-day period on the average?

A. All right, let's look at Douglas-El Paso. We have 29 trains east and 28 trains west as compared with the 27-day period.

The Court: I possibly overlooked the Douglas-Bisbee Junction operation where you actually had 48 trains there; that was included in the total of 176?

A. That is right.

The Court: That may account for it.

A. That helps to account for it, but between Douglas and El Paso they apparently ran one train in one direction and two trains in the other direction over the one train per day and we exceeded that a little bit between Tucson and Douglas. Just what the occasion for that was I don't know, but the big difference was that it should have included the Douglas-Bisbee Junction turnaround and which are put in here because during the long train operating period we ran

nine of those Douglas-Bisbee Junction trains over 70 cars in length as is indicated in columns C and E. They fit into [fol. 3373] a through train operation occasionally, too, and this is the use we made of them in our 1938 redispatch. They handle empty ore cars from Cakmet, a station near Douglas, west to Bisbee Junction, and they have a little excess capacity on the locomotive; and on the redispatching operation in 1938 we had them handle some empty cars west from Douglas to Bisbee Junction where those empty cars would be set out and picked up by this one train a day west operating between Douglas and Tucson. The maximum grade west from Douglas occurs between Douglas and Bisbee Junction, and the Douglas-Bisbee Junction turnaround train thus assisted one local train west in handling the tonnage over the most difficult part of the trip.

Mr. Mason:

Q. Going to exhibit No. 235, Mr. Sines, does the fact that the saving was substantially all on the westward movement as indicated here reflect the opportunity or lack of opportunity for long train operation imposed by the siding lengths?

A. Yes, there are two factors governing the length of the eastward trains, one of them was siding length and one of them was capacity of present power.

Q. In this case the eastward trains in a practical sense, [fol. 3374] because of the long westward trains, could not exceed siding length in the same territory, is that correct?

A. Yes.

Q. With the present siding lengths even if the Train Limit law were disregarded, would it in a practical sense be a one-way operation in one way or the other so far as exceeding the 70-car limitation was concerned?

A. You might say that was the general situation although yesterday or the day before I did mention cases where by timing the departure of trains from terminals it is possible to exceed the siding length with trains in each direction, but that is not a regular and general operation.

Q. Would a condition of this kind, as indicated by exhibit No. 235, obtain in greater or less degree throughout the year if the law were disregarded?

A. It would obtain to this extent the year round first in one direction and then in the other direction depending upon the surges and the movement of traffic.

Q. Wherever the unbalance happened to be?
A. Yes.

The Court:

Q. Mr. Sines, to put this another way, your entire re-
[fol. 3375] dispatch study on all of the exhibits that have been admitted in evidence disclosing the effects of it is based upon a Utopian condition, that is, if all of the sidings were extended and if we had big power here is what we could do. You are not able, when you were turned loose for 27 days, to make anywhere near as good a showing on your actual operation without restriction of the law as you were able to show on your redispatching study which, as I put it, was somewhat of a Utopian situation?

A. That is true. You will remember that one of my very first exhibits was a siding extension program and then we followed that shortly with my assignment of power.

The Court: When I say "Utopian," I don't mean to infer that that condition could not—that is, a favorable condition could not be realized with the necessary outlay of money to improve the rights of way and so forth.

Mr. Mason:

Q. Mr. Sines, would there be any practical benefit of extending the sidings if the law is to be observed?
A. No.

The Court:

Q. In other words, you get along very nicely as it is?
[fol. 3376] A. Yes, sir.

Q. And have been getting along with the sidings of the present length these many years?

A. Always with the shackles of the law around us, we manage to get along, yes. Our present plant is adequate to handle the business the way we have to handle it.

Mr. Booth: The law gave us all we were doing then but froze us at that point.

The Court: I think I see the situation.

Mr. Mason:

Q. Again, Mr. Sines, you have shown what the cost would be both from the capital standpoint and on the annual basis

as opposed to the gross saving which would be achieved if the law were disregarded with the implements at hand to disregard it, have you?

A. Up until now I have only given you an indication of what the savings would be as regards train-miles. I haven't got to the money stage yet, but I hope to soon.

Q. Except as to the wages?

A. Yes.

Q. Let's return to exhibit No. 235. This shows what the saving could be with the present far from ideal conditions?

A. That is right.

[fol. 3377] Q. And is in a sense an example of the saving which was achieved, is it not?

A. Exactly.

Mr. Strouss: I think I am going to have to object to that as leading.

The Court: Yes, the last question was leading; objection sustained.

A. There is one other comparison I would like to make between exhibit No. 234 and exhibit No. 235, if I may. Looking at the figures in the total, columns H and P, for the Yuma-Gila territory, it is apparent that eastward the redispatching operations show we would have had to run only one more train if we had observed the law eastward and we would have had to run 21 more trains westward if we had observed the law. That, in large measure, is the reason for the close proximity of the lines on exhibit No. 235 in the eastward operation. There is only a difference of one train in the Yuma-Gila district eastbound, one train in the Gila-Tucson district eastbound, one train from Tucson to Lordsburg eastward. The greatest difference, or practically the entire difference, occurs in westward operations, which is shown by the separation of the lines on exhibit No. 235 on the westward block.

[fol. 3378] The Court: You have already testified that the April traffic covered by the period that you were operating without the restriction of the Arizona law, that the bulk of that was westward?

A. Yes, sir, I would rather say the preponderance was westward.

[fol. 3379] Mr. Mason: Mr. Sines, looking at exhibit No. 235, will you say whether or not this represents graphically a saving which might reasonably be achieved forthwith if the restrictions of the law were lifted or discarded?

A. Yes.

Q. Would any additional capital outlay be involved in achieving this particular saving?

A. None at all. There is another twist that you don't see there unless your attention is called to it particularly. Between Lordsburg and El Paso redispatched trains were longer than the actual trains westward because in actual operation, we did take a few cars off the north line and sent them down through Douglas, a very few. On the redispatched operation they returned on their normal route on the north line.

The Court: And this exhibit 235 doesn't cover the operations on the south line at all?

A. No.

Q. Whereas, Exhibit 234 shows both?

A. Yes, sir.

Mr. Mason: Is there anything further on Exhibit 235, Mr. Sines?

A. No.

Q. Have you before you a statement in two sheets en- [fol. 3380] titled "Redispatch Study—Operating Statistics, Yuma, Arizona, to El Paso, Texas, for period April 4th to April 30th, 1940, Actual Operation Compared with Redispatched Operation, Observing Seventy Car Restriction and Using Present Power and Short Sidings."

A. I have.

Mr. Mason: May we have this statement marked "Exhibit 236," your Honor?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 236 for identification.

Mr. Mason: Was this exhibit prepared by you or under your supervision, Mr. Sines?

A. It was prepared under my direction and supervision.

Q. From what sources?

A. From the totals on the white work sheets A; and back of the white work sheets A, of course, are the actual and redispatch train sheets.

Q. You call a portion of this exhibit, a block of the exhibit refers to the north line. Is that the line via Gila and Lordsburg?

A. Once again that means the line by Gila and Lordsburg.

Q. You show separately the statistics for that line and the [fol. 3381] south line, do you?

A. Yes.

Q. How did you arrive at the—perhaps I should ask you first, does this exhibit correspond to No. 226?

A. Yes.

Q. Was it prepared along the same lines?

A. It was.

Q. I take it that all of the notations which are shown by numbers in parentheses are explained in full on the second sheet?

A. That is right.

Q. Are there any differences between this exhibit and Exhibit 226, as to method of compilation which require explanation?

A. No.

Q. Now, you show in each block, the separate blocks being identified by Roman numerals, the notation "Increase for Period." Does that mean the increase in the number of the various items shown in columns A to F, inclusive, for the period April 4th to April 30th, inclusive, 1940?

A. Yes, as indicated in the title.

Q. Has the exhibit been checked?

A. It has.

Q. And the totals, are those correctly computed?

[fol. 3382] A. Yes.

Q. What is the purpose of the exhibit?

A. To show the results of the redispatch study in these operating statistics, and also to develop figures upon which to base estimates of costs.

Q. Now, Mr. Sines, I think that in your oral testimony with reference to exhibit 234, you stated that there were 114 more trains operating in redispatched operations than were actually operated. If I read your exhibit correctly, the difference is the difference between 1,550 and 1,614, the figures appearing on exhibit 234, and that difference would be 64?

A. That is right, my 114 was in error.

Q. Does that same computation appear in actual figures in the total for the north line for the number of trains in the first column of exhibit 236 for identification?

A. It does.

Q. Is there any additional explanation you desire to make with reference to the notes on the second sheet?

A. No, only to call attention to them and to the fact that they are explanations of the numbers appearing on the face of the first sheet.

Q. Are they largely or entirely for the purpose of ac- [fol. 3383] counting for the difference between the number of cars actually moved and the number of cars moved on the redispatch study?

A. That is right.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has the Court any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Exhibit No. 236.

Mr. Strouss: The same objection as to the previous exhibit.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 236.")

Mr. Strouss: Do you have the 521 and 1232's for 1940?

A. Yes.

Mr. Strouss: I would like to have copies of those.

The Witness: All right.

Mr. Mason: Forms 521 and 1232 for 1940?

Mr. Strouss: Yes.

Mr. Mason: Is that all complete now?

The Witness: Yes, that is available.

[fol. 3384] Q. Mr. Sines, did you as a result of and in connection with the redispatching study of April, 1940, prepare an exhibit reflecting the arrival times at El Paso, Texas, of fruit blocks and manifest sections moving during that period?

A. Yes, sir.

Q. Similar in form to your exhibit 227?

A. Yes.

Q. Will you state its title, please?

A. "Arrival time at El Paso, Texas, of Fruit Blocks and Manifest Sections, Actual Operation Compared with Redispatch Operation, Observing Seventy Car Restriction and Using Present Power and Short Sidings, April 4th to May First, Inclusive, 1940."

Q. From what sources was this exhibit prepared?

A. From the actual and the redispatch train sheets.

Mr. Mason: May this be marked Exhibit 237, your Honor?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 237 for identification.

Mr. Mason: Has it been compared with the actual and redispatch train sheets?

A. It has.

[fol. 3385] Q. And I take it that the computations which are shown in the second, third, fourth and fifth sheets in columns G and H are your own computations?

A. That is right.

Q. Is it substantially identical in form to Exhibit 227?

A. Yes.

The Court: Mr. Sines, you haven't added an extra day on us here? All your previous exhibits referred to the period April 4th to April 30th, and this goes from April 4th to May first.

A. Well, I would explain that by saying that one of the trains that left Lordsburg on April 30th arrived at El Paso 5 A. M. May first.

The Court: Was that the reason for including the May first date?

A. Yes, that is shown on sheet 5.

Q. And that was the only reason?

A. Yes.

Mr. Mason: I should have said, Do the explanations made in connection with Exhibit 227 likewise apply with reference to Exhibit 237?

A. They do.

Q. Is the exhibit true and correct to the best of your knowledge and belief?

A. It is.

[fol. 3386] Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: You didn't have any difference in this one with respect to arriving at the yard and arriving at the ice house?

A. No, in April 1940, the ice house was not operated.

The Court: This covers the north line and has nothing to do with the south line?

A. That is right. I might say that none of our perishable trains operate over the south line in normal operation; they all go through Lordsburg.

Q. Is that because you can make quicker time that way?

A. Yes, and because the north line is a cheaper route to operate than the south line.

Q. What is the difference in the operating time between Tucson and El Paso, say, over your north line and over your south line?

A. That is largely a matter of train interference and distance. It is 30 miles longer through Douglas than it is over the north line, and it depends on the number of trains which you have to meet. My answer a moment ago when I said yes, it is a quicker route, was not an exactly correct answer, there are so many other factors involved in that besides just dispatching speed.

[fol. 3387] Mr. Mason: It is thirty miles shorter, that contributes some difference in the cost and time?

A. That is right.

Q. Then with the refrigerator cars there is two cents per car-mile each way?

A. That is right.

Q. You might explain to the Judge what it costs the company.

A. We pay the Pacific Fruit Express Company, and any other railroad in the United States pays the Pacific Fruit Express Company two cents a mile for the use of that car whether the car be loaded or empty.

The Court: And if the car were not moved you wouldn't have to pay anything for that day?

A. No, sir.

Q. Whereas, with these other connecting carriers where their cars are on your line you pay a dollar a day?

A. That is right.

Mr. Mason: Now, the difference is that refrigerator equipment is paid for on the mile basis and ordinary boxcar equipment is paid for on the day basis?

A. That is right.

Q. Now, the difference between moving seventy refrig- [fol. 3388] erator cars to El Paso by Lordsburg and moving seventy refrigerator cars to El Paso by Douglas is sixty cents a car, is it not?

A. That is right.

Q. Or $42 for a seventy-car train?

A. That is right.

Q. Is that one reason for moving trains over the shorter route?

A. That is one of the reasons.

Q. And the expense of hauling a train thirty miles further?

A. Yes.

Q. Independent of the car rental feature?

A. Yes.

Mr. Mason: I offer Exhibit 237 in evidence.

Mr. Strouss: The same objection as to the previous exhibit.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 237.")

Mr. Mason: Will you take up an exhibit in three sheets entitled "Arrival Time at Yuma, Arizona, of 'SSW' and 'GBW' Westward Manifest Trains, Actual Operation Compared with Redispatched Operation, Observing Seventy Car [fol. 3389] Restriction and Using Present Power and Short Sidings."

A. Yes.

Mr. Mason: May that exhibit be marked Exhibit 238, your Honor?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 238 for identification.

Mr. Mason: Does this exhibit correspond to your exhibit 228, Mr. Sines?

A. It does.

Q. What is the source of the information shown on the exhibit?

A. The actual and redispatch train sheets.

Q. Is the information shown here abstracted directly from the actual and redispatch train sheets?

A. It is.

Q. The computations in columns F and G are computations appearing from the figures in the preceding columns, are they?

A. Yes.

Q. Has the exhibit been checked to determine whether it is true and correct?

A. It has.

Q. Will you say whether or not it is true and correct?

[fol. 3390] A. It is.

Q. I take it that its purpose is the same as the preceding exhibits of the same form?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit as Exhibit No. 238.

Mr. Strouss: The same objection.

The Court: The objection is overruled. It may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 238.")

Mr. Mason: Have you an exhibit in one sheet entitled "Redispatch Study Wage Data Yuma, Arizona, to El Paso, Texas, for Period April 4th to April 30th, 1940?"

A. I have.

Q. And this exhibit again compares the redispatched with actual operation, observing the seventy-car restriction and using present power and short sidings?

A. That is right.

Mr. Mason: May this exhibit be marked Exhibit No. 239, [fol. 3391] if your Honor please?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 239 for identification.

Mr. Mason: From what source was it prepared, Mr. Sines?

A. From the white work sheets A.

Q. What other exhibit, if any, preceding does this exhibit resemble?

A. This exhibit resembles Exhibit 229.

Q. Was it prepared in the same way?

A. It was.

Q. This, I take it, is the converse or opposite, so to speak, of 229 in that this shows an increased expense by reason of the redispatched operation rather than a reduction?

A. That is right.

The Court: Mr. Sines, referring back to exhibits 237 and 238 for a moment, I am not certain that I get the import of the data contained under 5A on the front page of each exhibit. Now, do I understand that with your redispatch trains, that they actually make better time and arrive in advance of those that I will term long trains to the extent shown there in that exhibit?

A. Yes.

[fol. 3392] Q. In other words, the longer train slowed up operations?

A. Yes, because of the handicap of short sidings.

Mr. Strouss: Now, that last, I move it be stricken.

The Court: Yes, it was volunteered and it may be stricken.

Mr. Mason: Now, Mr. Sines, in actual operation eastward, as represented on No. 237, were there any substantial number of long trains operated?

A. In eastward operations, there were twelve long trains operated between Yuma and Gila, sixteen between Gila and Tucson, seven between Tucson and Lordsburg.

Q. And that is out of a total of something like 1,172 trains, isn't it?

A. That is right.

Q. So there was no substantial long-train operation eastward which might have resulted in long trains arriving to any extent later than short trains would have arrived?

Mr. Strouss: I object to that as leading.

Mr. Mason: I will withdraw the question.

Q. I think you had explained that Exhibit 239 was prepared along the same lines and in the same manner as [fol. 3393] Exhibit No. 229?

A. That is right.

Q. Have you checked the exhibit against the underlying sources, Mr. Sines?

A. I have.

Q. Now, as to the variable items in columns B and H, I think you have explained how that item was calculated in connection with Exhibit 229. I will ask you if you followed the same methods here.

A. That is right. The variable item in this instance is increased in the same proportion as the increase in train miles for trainmen and locomotive-miles for enginemen.

Q. And in computing the railroad retirement and unemployment insurance tax, does that represent moneys paid by the company as and for that particular type of tax based upon the wages?

A. Yes; sir.

Q. Is it computed only against the difference between the actual and the redispatched wage items?

A. That is all.

Q. Where do you obtain this 5.94 per cent?

A. In 1938, the company's proportion of those two taxes totaled five and three-quarters per cent, but in 1940 it had advanced to 6.0 per cent.

Q. But you show here 5.94. Is that because of the elimi- [fol. 3394] nation of a portion of the wage payments from the incidence of the tax?

A. Yes, those salaries totaling more than $300 a month.

Q. Then, this is the actual money tax paid for trainmen's wages applied against the total amount paid them as wages and a ratio thus derived rather than taking the flat six per cent?

A. That is right.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions before the exhibit is offered?

The Court: No.

Mr. Mason: We offer the exhibit as defendant's Exhibit 239.

Mr. Strouss: The same objection as to the previous exhibit.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 239.")

Mr. Mason: Mr. Sines, have you made any attempt to expand the figure of the wage decrease, or, rather, increase, as indicated so as to arrive at an annual figure for 1940.

[fol. 3395] A. No, I have not.

Q. This $3,832.32 simply represents, according to the exhibits whatever wage savings plus tax there may have been in 27 days?

A. That is right.

The Court: Mr. Sines, referring now to Exhibit 229 as well as to Exhibit 239, I notice, first on the exhibit 229 that in your redispatching study, the cost of the items shown on this exhibit actually increased on the south line to the tune of $558.93?

A. Yes.

Q. And on your corresponding exhibit 239, you were able to show a decrease for the period over the south line of $8.84?

A. That is right.

Q. Now, forgetting the south line for a moment, your real economy or saving for the period June and August, 1938, as shown by exhibit 229, was $48,000 plus for the two months. Dividing that by two would give you approximately $24000 a month average saving?

A. That is right.

Q. That was under the ideal conditions heretofore testi-

[fol. 3396] fied to with long sidings and the heavy power?

A. That is right.

Q. As opposed to that, under your redispatching study of the period April 5th to 30th, shown by Exhibit 239, you were only actually able to make a saving where you operated without the restriction of the Arizona law of the sum of $5,000 plus, or less than a fourth of the estimated savings under your ideal conditions?

A. That is right.

Mr. Mason: Mr. Sines, the items mentioned in the Court's question relate only to wage savings on the north line?

A. Yes.

The Court: And it only covered, I appreciate a 27-day period as against a full month on the other.

Mr. Mason: What is the basic reason why the saving in April as indicated by Exhibit 239, omitting the small item of tax, would be $5,518 as indicated by the exhibit, whereas it would be, as suggested by the Court, approximately $24,000 per month, as shown by Exhibit 229?

A. The whole answer is found in column B of each exhibit. Under ideal conditions we can save $114,240 train [fol. 3397] miles in two months, or 57,000 in one month, according to Exhibit 229, but on exhibit 239 we were able to save 8,733 train-miles, and when we say "ideal conditions" we have in mind the extended sidings and larger power.

Q. Are these ideal conditions in any sense impracticable or out of reason?

A. No, they are found on every other part of our main line on this railroad, with the exception of the territory in Arizona.

Q. Now, you say that the difference is found in the difference in train-mile saving. What is it that prevented a train-mile saving, if one was prevented, in April of 1940, but which permitted a more substantial train-mile saving, if one was permitted, by the redispatching study of 1938; what physical condition is it, or other condition?

A. The length of sidings and power.

Q. And what is it that prevents those sidings from being extended today? Is there anything to prevent them from being extended?

A. No, we can extend them as shown by my siding extension program if there is any reason to extend them.

The Court: We will take our afternoon recess.

(Thereupon, a short recess was taken, after which the witness was recalled to the stand, and proceedings were resumed as follows:)

[fol. 3398] Mr. Mason: I don't believe exhibit No. 239 has been offered.

The Court: It was admitted.

Mr. Mason:

Q. Mr. Sines, have you reviewed the forms 521 for 1940 to determine the percentage relationship between the traffic

handled in April of that year as measured in gross ton-miles on the Tucson division and the traffic handled in the entire year?

A. I have.

Q. What percentage of the total traffic of the Tucson division measured in gross ton-miles was handled during the month of April, 1940?

A. During the entire month of April there was handled 8.65 per cent of the total year's business.

Q. What would one-twelfth of the year be?

A. 8.33 per cent. During the twenty-seven days of April, figuring that on the basis of twenty-seven thirtieths of the 8.65, there was handled 7.78 per cent.

Q. Mr. Sines, will you turn to an exhibit in one sheet bearing title, "Main Line Freight Trains of Various Lengths Operated between Yuma, Arizona, and El Paso, Texas, Via Gila, Arizona, and Lordsburg, New Mexico, and Via Douglas, Arizona, over South Line during Period [fol. 3399] April 4th to April 30th, 1940, Inclusive, Actual Operation Compared with Redispatched Operation with no Restriction and Using AC Power and Long Sidings"?

A. Yes.

Q. Have you that exhibit before you?

A. I have.

Q. What is the basis of this exhibit?

A. The basis of this exhibit is a redispatched study to determine what the results would have been during the 27-day period of April had we been able to operate with long sidings and with larger power.

Q. The series of exhibits just concluded ending with exhibit No. 239 had to do with making long trains into short ones, had it?

A. Yes, sir.

Q. And the first redispatching study of 1938 had to do with making Arizona-size trains, 70 cars or less, into long trains with AC power and long sidings?

A. Yes.

Q. What is this redispatching study?

A. This takes the long trains of the 27-day period, April 4th to 30th, and makes longer trains out of them assuming that we have longer sidings and larger power.

[fol. 3400] Q. Do you contemplate for the purposes of this study the same siding extensions and same types of

locomotives as were contemplated for the 1938 redispatching study?

A. Yes, sir.

Q. What underlying documents did you employ in preparing the exhibit before you?

A. This exhibit was prepared from the actual and redispatched train sheets.

Mr. Mason: May we have this statement marked as "Defendant's Exhibit No. 240" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 240 for identification.

Mr. Mason:

Q. Does it resemble any of the preceding exhibits, Mr. Sines?

A. Yes, we have two exhibits like this, one of them is No. 234 and the other is No. 214.

Q. I take it this is simply a train count from the actual and redispatch train sheets?

A. That is right.

Q. Does the actual showing on this exhibit reproduce the showing of actual — which is on exhibit No. 234?

A. It does.

[fol. 3401] Q. Has the exhibit been checked against the underlying sources?

A. It has.

Q. Will you say whether or not the exhibit is correct insofar as it reflects those underlying sources?

A. It is correct.

Q. Now as to the computations, have they been checked?

A. They have.

Q. Will you say whether or not they are correct?

A. They are.

Q. I take it this exhibit has a purpose similar to that previously stated by you for exhibit Nos. 214 and 234?

A. Yes, sir.

Mr. Mason: Have you any questions on exhibit No. 240, Mr. Strouss?

Mr. Strouss: No questions at present.

Mr. Mason: Has the Court?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 240.

Mr. Strouss: The same objections as to the previous exhibits.

[fol. 3402] The Court: Objections overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 240.")

Mr. Mason:

Q. If I read the exhibit correctly, there was practically no change made in the South Line operations as between the actual and redispatch operations during the period covered by exhibit No. 240?

A. That is right.

Q. The only change, or at least the only change of any account, is in the making of the trains actually operated into still longer trains on the basis of AC power and longer sidings?

A. Yes.

The Court: Then the real gist of this is expressed in the recapitulation there that under your actual long train operations during this period you had 25 plus per cent of trains with over 70 cars, whereas under your ideal conditions you stepped that up to 76 per cent?

A. That is right.

Mr. Mason:

Q. Mr. Sines, have you any other comments on exhibit No. 240?

A. No, but right along the line of the judge's last question I would like to call attention to exhibit No. 214, re- [fol. 3403] capitulation of the redispatch, indicating that in June and August, 1938, we showed 80 per cent of trains over 70 cars.

The Court: How do you reconcile the difference in percentage there?

A. I was wondering how I was going to volunteer the thought that that is a pretty good comparison.

Mr. Mason:

Q. Will you turn to a chart in one sheet entitled, "Relative Train Lengths, California, Arizona, New Mexico,

Texas, Through and Local Freight trains operating via Yuma, Gila, Tucson, Lordsburg, and El Paso, Excluding Strauss Turn-around Trains, Based on Redispatching Study of April, 1940, with No 70-Car Restriction and Using All Power and Long Sidings"?

A. Yes.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 241" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 241 for identification.

Mr. Mason:

Q. By the way, Mr. Sines, exhibit No. 240 and exhibit No. 241 for identification are related to the redispatching study which is identified as item No. 6 on your exhibit No. [fol. 3404] 196, are they not?

A. Yes.

Q. Does this exhibit resemble exhibits Nos. 215 and 235?

A. Yes.

Q. Prepared in the same manner?

A. Exactly.

Q. From the same sources or similar sources to these exhibits?

A. Yes.

Q. Has the exhibit been compared against these underlying sources to determine its correctness?

A. It has.

Q. In order that the record may be complete, will you state what is the principal underlying source for the information shown for the territory east of Yuma?

A. Statistics from the actual and redispatched train sheets.

Q. Is the exhibit true and correct?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has the Court?

The Court: No.

[fol. 3405] Mr. Mason: We offer the exhibit as defendant's exhibit No. 241.

Mr. Strouss: The same objections as to the previous exhibits.

The Court: Overrule the objections, it may be admitted.

(The document referred t was received in evidence and marked "Defendant's Exhibit No. 241.")

Mr. Mason:

Q. Mr. Sines, I will ask you first to take your exhibit No. 241 and your exhibit No. 215. Exhibit No. 215 shows that in the redispatch operation you were able to obtain during June and August, 1938, train lengths east of Yuma running between 85.2 cars per train and 89.1 cars per train, whereas the showing on exhibit No. 241 ranges from 76.7 cars per train up to 83.2?

A. That is right.

Q. How do you explain that difference?

A. In April we were in a different perishable season than we were in June, 1938, or in June of any year. In June, 1938, we were receiving very long trains from the Imperial Valley. We didn't have those trains in April and the result was that the trains redispatched east from Yuma did not attain quite as great a length as they did during June, 1938.

[fol. 3406] Q. Is that difference illustrated by the figure of actual average train length in the district of eastward trains in the territory west of Yuma?

A. That is right.

Q. There is also some difference between the westward average train lengths in the territory east of Yuma. You show on exhibit No. 215 an average train length very close to 93 cars throughout the territory from El Paso to Yuma; whereas in the 1940 redispatch the train length varies down from 92.8 to 84.6?

A. That is right.

The Court: In that connection, Mr. Sines, I notice from exhibit No. 241 that your train lengths under this redispatching study of April, 1940, you get progressively longer trains the further east you get clear into El Paso, and as compared to your California actual operations during that same period which were under no law restriction you only had 81.5 as against 92.8 over in your Rio Grande division. In other words, you are getting progressively longer trains as you go eastward.

Mr. Mason: I think your Honor is referring to a westward movement.

The Court: I guess I am incorrect there.

[fol. 3407] Mr. Mason: While your Honor's question does refer to the westward movement, I would like to ask the witness if there is any particular explanation to be made there?

A. The same tendency is evident in exhibit No. 215 and I don't find any ready explanation for that except it is the result of the entire railroad operation where trains east must balance or should nearly balance with the trains west.

Mr. Mason:

Q. You mean as to number or length?

A. As to number.

The Court: Could that be explained by the fact that some of those cars are dropped off into Arizona local traffic?

A. No.

Q. Shipments consigned to Arizona?

A. I wouldn't think Arizona local traffic would affect this very much in April. There is a considerable difference in the length of trains westbound from Yuma comparing June and August, 1938, against April of 1940. That, again, is due to the fact that in June, 1938, we were running long trains into the Imperial Valley as well as out of the Valley, whereas in April, 1940, we were not running those particular trains and a large part of the operation west of Yuma [fol. 3408] was confined to the line Yuma to Indio.

Mr. Mason:

Q. Mr. Sines, will you take exhibit No. 241 and also exhibit No. 235. Have you exhibit No. 235 before you?

A. Yes.

Q. I will ask you whether it is possible with those two exhibits to determine or to visualize, let us say, the differences between redispatched operation using AC power and long sidings in April, 1940, and operations in complete compliance with the Arizona law?

A. Yes.

Q. How is that done?

A. It would be possible to superimpose exhibit No. 235 over exhibit No. 241 so that the line 68.7 between Yuma

and Gila would lie directly on the line 68.7 between Yuma and Gila and you would then find that the redispatch short operation of 62.7 cars would compare with the redispatch long train operation of 84.6 cars and the hatched portion of the chart would extend down to the 62.7 line.

Q. Would it be possible simply to draw in the lines representing the redispatched short train operation on exhibit No. 235 in their proper places on exhibit No. 241 in order to obtain the complete picture?

[fol. 3409] A. That is right.

Q. In other words, the two charts can be combined so as to give the full difference such as is indicated by exhibit No. 215?

A. That is right.

Q. Will you turn, please, to a statement in two sheets entitled, "Redispatch Study, Operating Statistics, Yuma, Arizona, to El Paso, Texas, for Period April 4th to April 30th, 1940, Actual Operation Compared with Redispatched Operation, with No Restriction and Using AC Power and Long Sidings"?

A. Yes.

Mr. Mason: May this exhibit be marked No. 242 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 242 for identification.

Mr. Mason:

Q. Did you prepare or supervise the preparation of exhibit No. 242?

A. I did.

Q. From what sources was it prepared?

A. From the white work sheets A which were compiled from the actual and redispatched train sheets.

[fol. 3410] Q. You show here a segregation by freight train districts, does that correspond to segregations on previous exhibits similar in form to this?

A. That is right.

Q. Will you identify those previous exhibits?

A. Exhibit No. 226 is the corresponding exhibit for the June and August, 1938, redispatch, and exhibit No. 236 is the corresponding exhibit for the April 4th to 30th redispatch using present power and short sidings.

Q. Was this prepared in exactly the same way as exhibit No. 226 and No. 236?

A. Yes, sir.

Q. You show an average number of cars per train in column F for each of the districts. Are those the average lengths counting the trains in both directions?

A. Yes.

Q. Whereas the average train lengths shown on exhibit No. 241, for example, are computed separately as to eastward and westward trains?

A. That is right.

Q. One other item, in column F you show cars per train, whereas in other columns there appears to be a difference styled, "Decrease for period," and in column F that desig-
[fol. 3411] nation doesn't appear to apply. Will you explain that?

A. Apparently there was an oversight in the preparation of this exhibit. The "I" indicating increase at the bottom of the sheet would apply or should have been placed in front of each one of those differences.

Q. That is where the figure for the redispatch is greater than the figure for the actual?

A. Yes.

Q. Here I see no substantial difference as to the South Line. Was the South Line redispatched in this particular item No. 6 of exhibit No. 196?

A. No, we didn't perform any redispatch study but we included the statistics on here in order to give us a showing which would be comparable to the other two showings.

Q. The South Line statistics are included on each of the other showings corresponding to exhibit No. 242?

A. Yes.

Q. Has this exhibit been compared to determine whether it is correct?

A. It has.

Q. Have the computations and additions, subtractions, and multiplications been checked?

A. They have.

[fol. 3412] Q. Will you say whether or not it is true and correct?

A. It is.

Q. I take it that its purpose is as already explained in connection with the exhibit No. 226 and No. 236?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 242.

Mr. Strouss: Same objections.

The Court: Objections overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 242.")

The Court:

Q. Mr. Sines, for the record will you indicate on this exhibit No. 242 just where the figure "I" indicating increase should appear in column F and I will ask the clerk to make the proper notation on his copy as I will on mine.

A. In the line entitled "Decrease for period" in the following subdivisions indicate with the Roman numerals [fol. 3413] I, II——

The Court: That will be opposite 17.2?

A. Yes.

The Court: All right, go ahead.

A. In subdivision II, 19.4; in subdivision III, 20.9; in IV, 15.3; in VI, 18.3; in V also because there were no Strauss turnarounds in actual performance whereas we ran some on the redispatch so that is an outright increase opposite the 88.1.

The Court: Any on the South Line?

A. No, but in the final summary in subdivision XI, opposite 16.2.

Mr. Mason:

Q. Will you take up now a statement in four sheets entitled, "Arrival Time at El Paso, Texas, of Fruit Blocks and Manifest Sections, April 4th to May 1st, Inclusive, 1940," and also headed "Redispatched AC Power." I take it this also contemplates the use of longer sidings?

A. That is right.

Mr. Mason: May we have this exhibit marked "Defendant's Exhibit No. 243" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 243 for identification.

Mr. Mason:

Q. Did you prepare or cause to be prepared defendant's [fol. 3414] exhibit No. 243?

A. I did.

Q. From what sources?

A. From the actual and redispatched train sheets.

Q. Is this exhibit similar in form to the preceding exhibit showing arrivals at El Paso?

A. It is.

Q. No. 237 and No. 227 particularly?

A. That is right.

Q. Will you say whether or not it was prepared in the same manner?

A. It was.

Q. I take it that the computations or showings of hours and minutes in columns F and G on sheets Nos. 2, 3, and 4 are predicated upon the times shown in columns C and E?

A. That is right.

Q. Then you summarize that entire showing on sheets Nos. 2, 3, and 4 in the block on the first sheet?

A. Right.

Q. Were there any operations of trains either actual or redispatched at El Paso into the ice house tracks as against operations into the train yard?

[fol. 3415] A. No.

Q. What is the point of arrival of these trains actual and redispatched at El Paso?

A. Octavia Street yard.

Q. Has the exhibit been checked against the underlying sources?

A. It has.

Q. Will you say whether or not it is true and correct?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Your Honor?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 243.

Mr. Strouss: The same objections as to the preceding exhibits.

The Court: Objections overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 243.")

The Court:

Q. Mr. Sines, referring to this exhibit No. 243, I notice that your long train operations under ideal conditions that [fol. 3416] you get those trains into their destinations in advance of the actual operations the greater portion of the time?

A. That is right.

Q. Whereas in the previous exhibits in response to the question from the Court I believe you admitted that the so-called "long train operation" slowed it up due as you said then to your short sidings?

A. That is right.

Q. Now, with this exhibit you have your ideal conditions of long sidings and heavier power you make better time apparently, at least it is so reflected in this exhibit?

A. That is right.

Mr. Mason:

Q. Mr. Sines, is it possible by comparing exhibit No. 243 with exhibit No. 237 to have some comparison of the number of trains actually operated, the number of trains which would have been operated if the law had been completely observed and the number of trains which would have been operated if the long sidings and heavier power had been available?

A. Yes.

Q. Where do you find that comparison?

A. On exhibit No. 237 in line 3 redispatch we find 185 [fol. 3417] which is the number of trains which would have been operated had we complied with the provisions of the law.

Q. Is that correct or is it in line 2, number of trains arriving El Paso?

The Court: Possibly the witness didn't understand the question.

Mr. Mason: I referred not to the number of blocks but to the number of trains.

A. That is right. The answer to that is you cannot tell by looking at exhibit No. 237 what the difference in trains was eastward. I don't know that that is responsive to your question.

Mr. Mason: You can tell by looking at No. 237 and No. 243, can you not, the number of trains in which the traffic was carried which actually arrived at El Paso as compared with the number of trains in which the traffic was carried which arrived at El Paso on either of the redispatch studies?

A. Yes, you can.

Q. That is shown on the face of the exhibit, is it not?

A. Yes, there were 165 trains that actually arrived at El Paso on both studies. There were 165 trains that ar-
[fol. 3418] rived at El Paso on the first redispatch study and there were 132 trains arriving El Paso on the second redispatch study.

Q. Will you say whether or not this lesser number of trains arriving at El Paso on the second redispatch study reflects a lesser number of trains operated in the territory west of Lordsburg?

A. Yes, in the second redispatch study the operation was a through, continuous operation.

Q. I take it by reference to exhibit No. 234 you can compare the number of eastbound trains operated during the long train period of April, 1940, in the territory between Yuma and Lordsburg which handled this eastbound traffic?

A. That is right.

Q. Mr. Sines, referring again to line 2 of the summary on exhibit No. 243, does the lesser number of trains arriving El Paso as shown there reflect a lesser number of interferences with the movement of those trains over the line betwen Yuma and El Paso?

Mr. Strouss: I object to that as calling for a conclusion. The exhibits are in here which speak for themselves.

The Court: Yes, the objection is sustained.

Mr. Mason: Perhaps what I asked for was in a sense elementary, Mr. Sines.

[fol. 3419] Q. As reflecting or indicating the effect of trains upon number of interferences, suppose we have a dis-

trict such as the district between Yuma and Gila or between Douglas and El Paso where there is only one freight train in each direction per day, how many meets will there be?

A. One.

Q. At most?

A. Yes.

Q. Suppose that the number is increased so there are two trains in opposite directions during the same period and they all have to meet, how many meets will there be?

A. Four.

Q. If the number is again increased to three in each direction, how many will there be?

A. Nine.

Mr. Strouss: That depends on whether they are running during the same period of time.

Mr. Mason: That is part of the assumption, that they are running during the same period of time.

A. That is right.

Q. Of course, meets could be avoided by running all of the eastward trains at night and all of the westward trains in the daytime?

[fol. 3420] A. Yes.

Q. If you could operate in that way?

A. Yes.

Q. Could you operate in that way?

A. Not practically.

Q. If you were to take a longer district, for example, as between Yuma and Lordsburg, you couldn't possibly get all your trains in one direction over the line before all the westward trains had to start or all the westward trains over the line before the eastward trains had to start, could you?

A. No.

Q. Will you say whether or not it is the general rule that a multiplication or an increase of the trains in opposing directions produces a disproportionate increase in the number of meets roughly equivalent to the square or product of the trains in the opposing directions?

A. That is the relationship, yes.

Q. Referring again to exhibit No. 243, would the lesser number of trains arriving at El Paso on the redispatch as indicated on the face of the exhibit as compared with

the number of trains actually arriving betoken more or less interference by reason of meets and passes?

[fol. 3421] Mr. Strouss: Your Honor, we have had exhibits in here as to meets and passes; they have one up there on the board now.

The Court: I will overrule the objection, he may answer.

A. Yes, it does.

Mr. Mason:

Q. More or less?

A. More.

Q. Will you turn now to a statement in three sheets bearing title, "Arrival Time at Yuma, Arizona, of 'SSW' and 'GBW' Westward Manifest Trains, Actual Operation Compared with Redispatched Operation, with No Restriction and Using AC Power and Long Sidings"?

A. Yes.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 244" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 244 for identification.

[fol. 3422] Mr. Mason: Did you prepare Exhibit No. 244, Mr. Sines?

A. It was prepared under my direction and supervision.

Q. From what sources?

A. From actual and redispatch train sheets.

Q. Does this exhibit correspond in general to exhibits Nos. 238 and 228?

A. It does.

Q. Did you follow the same methods?

A. Exactly.

Q. And make the computations in the same manner as already explained in connection with exhibits Nos. 238 and 228?

A. Yes, sir.

Q. Is the exhibit true and correct, to the best of your knowledge?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Any questions by the Court?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as No. 244.

Mr. Strouss: The same objection.

The Court: The same ruling. It may be admitted.

[fol. 3423] (The document referred to was recived in evidence and marked "Defendant's Exhibit No. 244.")

Mr. Mason: Will you turn to an exhibit in one sheet entitled "Redispatch Study Wage Data, Yuma, Arizona, to El Paso, Texas, for Period April 4th to April 30th, 1940. Actual Operation Compared with Redispatched Operation, with No Restriction and Using AC Power and Long Sidings."

A. Yes.

Mr. Mason: May we have this statement marked No. 245?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 245 for identification.

Mr. Mason: Did you prepare Exhibit No. 245 for identification, Mr. Sines?

A. It was prepared under my direction and supervision.

Q. Did you check it against the underlying sources?

A. I did.

Q. What are those sources?

A. The white work sheets A.

Q. Was this prepared from the entries on the white work sheets A of wage statistics in the same manner as Nos. 239 and 229?

[fol. 3424] A. Yes.

Q. You have used the same method indicating the totals and in applying the railroad retirement and unemployment insurance tax rates, as shown in line 12?

A. That is right.

Q. Will you explain just what was done in obtaining the variable items in columns D and H for the redispatched lines on the exhibit?

A. The variable amounts in the actual operations were reduced by the proportion of reduction of train-miles, first setting aside certain constant items and then adding those constant items back, such as switching at Gila and Lordsburg.

Q. Now, as to the enginemen's variable wages, did you use the locomotive-miles ratio?

A. Yes.

Q. Is the exhibit true and correct, according to the best of your knowledge and belief?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: We offer the exhibit in evidence as No. 245.

Mr. Strouss: The same objection.

The Court: The objection is overruled. It may be ad-
[fol. 3425] mitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 245.")

The Court: I notice the net result of this exhibit No. 245, Mr. Sines, is to increase the savings on wages as compared to Exhibit No. 239 by approximately three or four times?

A. That is right, and they are additive in this way, by adding the two together we get the difference between short train operation under the law and long-train operation with long sidings and big power for that 27-day period.

Mr. Mason: Now, going back to Exhibit 239, Mr. Sines, do I understand that the figure of $128,092 shown in the summary block 10 of the exhibit is the amount of wages, exclusive of tax, which would have been paid if the law had been fully observed?

A. Yes.

Q. And the amount of $103,508.99 in block 11 on exhibit No. 245 is the amount which would have been paid as wages, exclusive of tax, if long sidings and AC power had been used, and the law had not been observed?

A. That is right.

Q. It appears that the figure of $122,582.60 representing
[fol. 3426] actual wage payments is common to both exhibits?

A. That is right.

Q. To use a figure of speech, is that the center point from which you figure each way to the other results?

A. That is right, that is a good illustration.

Q. Is that what you had in mind when you said the figures were additive?

A. Yes.

Q. Is there any other feature of exhibit 245 to which you wish to draw attention?

A. Only to call attention to a computation which the Judge had me make in connection with exhibit 239 in order to refer back to exhibit 229. Half of the saving for the period in column L on exhibit 229 was $24,000, representing one month's savings, and here, in April, 1940, by adding these two figures together, we get something over $25,000, an exactly comparable item, short train operation compared with long train operation.

Q. And have you, Mr. Sines, an exhibit bearing the title "Statistics in Connection With Passenger Trains Exceeding Fourteen Cars in Length Operated During March and April, 1940?"

A. I have.

[fol. 3427] Mr. Mason: May this be marked 246 for identification, if your Honor please.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 246 for identification.

Mr. Mason: Did you prepare exhibit 246, Mr. Sines?

A. It was prepared under my direction and supervision. I have checked it and it is correct.

Q. From what sources was it prepared?

A. From the train sheets for March and April, 1940, supplemented by a review of the passenger conductor's wheel reports for the same period.

Q. I take it that Exhibit 246 for identification does not relate to any redispatching study concerning which you have just been testifying?

A. None whatsoever.

Q. It is based entirely on train sheets as supplemented by the passenger wheel reports?

A. Right.

Q. Now, precisely what have you done on this exhibit?

A. I have indicated the trains which operated in excess of fourteen cars within the boundaries of the state of Arizona during the months of March and April; I have com- [fol. 3428] puted the train miles that those trains negotiated and the car-miles accumulated during the time and only the time that their consist exceeded fourteen cars.

Q. If a train operated in the State of Arizona as for example No. 2, for only a portion of the distance across the

state, and for the balance of the distance across the state had fourteen or less cars, do you show any statistics with relation to the latter operation; that is, for the operation of fourteen cars or less?

A. No.

Q. And this includes only statistics of operation of passenger trains having fifteen or more cars for the period while they had that many cars?

A. Yes.

The Court: What actual period is covered here by this exhibit; from what date in March to what date in April?

A. I don't know what those are. I would have to look at our records to tell; I don't have it here available.

Mr. Mason: Approximately the 5th of March to the 27th of April?

The Witness: I seem to remember the 5th of March in connection with the passenger train that was testified to, [fol. 3429] and that was the first long train that was operated in Arizona.

The Court: And the passenger operations continued up until the 27th day of April, when you stopped your long freight train operations?

A. I can't answer that.

Mr. Mason: Now, how do you compute the train-miles shown here, Mr. Sines?

A. Well, just from the timetable distances between the stations between which the trains operated with over fourteen cars.

Q. The number of times that the operation was undertaken is shown in column C, headed "Times"?

A. That is right.

The Court: Mr. Sines, for your information and that of counsel, the complaint in this case, the second cause of action, indicates that the date was March second rather than March fifth.

The Witness: That was the first train, I know that.

Mr. Mason: Now, how do you obtain the car-miles shown here?

A. By examining the consists or the conductors' wheel reports, we determine the number of cars in excess of four-

teen cars and multiply those by the train miles negotiated, thus producing the car-miles.

[fol. 3430] Q. Now, do these car-miles in column E represent only the car-miles made by trains during the time that their consist exceeded 14 cars?

A. Exactly.

The Court: The other normal operations are not included in this exhibit?

A. No. For instance, look at the second item under Train 44. It says, "Yuma to Phoenix," and "Tucson to Arizona-New Mexico State Line." For that part of the train's operation between Phoenix and Tucson, neither the train-miles nor car-miles were computed, nor do they appear on this exhibit, because at that time the train had fourteen or less cars.

The Court: But this exhibit does cover all passenger operations in excess of fourteen cars to the train anywhere within the state of Arizona, both including the Phoenix line and the south line by Douglas?

A. That is right.

Mr. Mason: Now, suppose a train contained fifteen cars, Mr. Sines, and operated from Tucson to Phoenix, 121 miles, would the number of car-miles accumulated as shown here be fifteen times 121?

A. Yes.

[fol. 3431] Q. Not merely the excess over fourteen?

A. No.

Q. Mr. Sines, do you recall whether there was during the period covered by this exhibit one occasion where two trains, neither of them exceeding fourteen cars, were consolidated into a single train by reason of an engine failure?

A. That did happen, and account of that occurrence is not taken on this exhibit.

Q. Where did the engine failure occur, if you recall?

A. At Dock, Arizona, on a westward passenger train.

Q. And what happened then?

A. The train was consolidated with an immediately preceding or following passenger train and taken into Phoenix, a distance of approximately forty miles.

Q. Was that a case of engine failure between terminals?

A. Yes.

Mr. Mason: Your Honor will recall that the law exempts engine failures between terminals from the operation of the statute.

Q. You didn't take that into account in this showing here at all?

[fol. 3432] A. No.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: Yes.

Q. In the first item there is 435 train-miles and 6,646 car-miles. That would indicate a train of fifteen cars with 121 car-miles in addition. Would that mean that there had been a car put on that train at Phoenix perhaps, and brought to Tucson, and then dropped, making sixteen cars for that distance?

A. Yes, that would be a pretty good guess, Mr. Strouss.

Mr. Strouss: That is all.

Mr. Mason: Has your Honor any questions?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as Exhibit 246.

Mr. Strouss: The same objection.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 246.")

Mr. Mason: That concludes the exhibits, your Honor that we now have ready for introduction by Mr. Sines. We have [fol. 3433] a number of other exhibits in preparation for introduction by him, and except for the distance between here and San Francisco in connection with the reproduction, we would have them here today, but I doubt if we can have them before Tuesday.

The Court: You suggest then, Mr. Mason, that we recess until next Tuesday morning?

Mr. Mason: Yes, sir. I think that that would be in the interest of expedition and would enable us to have our exhibits in the proper form at that time.

The Court: You have no objection, Mr. Strouss?

Mr. Strouss: No, that is agreeable.

The Court: I understand from you that you still will be able to complete your defense by the end of our court session next week?

Mr. Mason: We expect to close our case in chief barring some unusual developments by Friday night of next week, starting on Tuesday morning; subject, of course, to the cross-examination which opposing counsel has suggested that he defer, and any redirect that we may have.

The Court: Then the hearing, the trial of this matter will be recessed until Tuesday morning, February 4th, 1941.

[fol. 3434] February 4, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: Whenever you are ready, you may proceed.

Mr. Mason: We will have to interrupt the course of Mr. Sines' testimony for a moment, to put on a witness who is here from San Francisco with one exhibit. I will call Mr. Barker.

LESLIE E. BARKER was called as a witness on behalf of the defendant and, being first duly sworn, testified as follows:

Direct examination:

By Mr. Mason:

Q. Please state your name and residence to the reporter, Mr. Barker.

A. Leslie E. Barker; Oakland, California.

Q. Where are your headquarters, Mr. Barker?

A. 65 Market Street, San Francisco.

Q. What is your position with the Southern Pacific Company?

A. I am office manager for the general superintendent of motive power.

Q. Are you in the headquarters of the motive power and [fol. 3435] mechanical department at San Francisco?

A. Yes, sir.

Q. You say general superintendent of motive power. You mean of the Southern Pacific Company?

A. Of the Southern Pacific Company, yes, sir.

Q. In your position as office manager, are you familiar with the records maintained in the motive power department?

A. Yes, sir.

Q. Will you describe the character of the records maintained in the motive power department with respect to the freight cars owned by Southern Pacific Company?

A. Well, we maintain a physical record of freight cars which shows the specifications of the cars and any changes that might be made in them after they had been placed in service.

Q. Are those records maintained by classes of cars distinguishing boxcars from stockcars, gondola cars, tank cars, and so forth?

A. Yes, sir.

Q. Is there an individual record for each car, according to its number and identification?

A. Yes, sir.

Q. Now, suppose that a car is taken to the shop and some actual change is made in the appliances on the car, [fol. 3436] as, for example, in the wheels, brake installation or draft gears; do you maintain a record of such changes?

A. We maintain a record of any physical change in the car. In other words, changing the type of the apparatus on the car. Where it is repaired in kind, and turned out the same way as it came in, we don't record that in our office.

Q. From what source do you obtain your information as to these physical changes, if any?

A. It is reported to us by the shop that does the work.

Q. Are those reports made to your office in the regular and ordinary course of business?

A. Yes, sir.

Q. Then what do you do with those reports; do you make entries from them?

A. We make entries from those of repairs into the permanent record describing the equipment.

Q. Have you before you a statement in one sheet entitled "Southern Pacific Company, Pacific Lines, Freight Cars Equipped with Friction Draft Gear, January 1, 1941?"

A. Yes, sir.

Mr. Mason: May this statement be marked, your Honor, defendant's Exhibit 247 for identification?

[fol. 3437] The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 247.

Mr. Mason: Did you prepare Defendant's Exhibit No. 247 for identification, Mr. Barker?

A. It was prepared under my supervision.

Q. Was it prepared in the office of the general superintendent of motive power?

A. Yes, sir.

Q. From what sources was it prepared?

A. Well, it was prepared from our permanent records describing the freight-car equipment.

Q. Have you those permanent records in so far as they were used in obtaining these figures upon this exhibit in Tucson with you?

A. Yes, sir.

Q. Are they available for the use of Mr. Strouss if he wishes?

A. Yes, sir; there is part of them here in the court room.

Q. You have part of them in the court room?

A. Yes, sir.

Q. And the balance of them are where?

A. In the office——

Q. Across the street?

A. Yes, at 90 Church Street.

Q. I take it that the information shown in column 1 of [fol. 3438] the exhibit is simply a description by types of the various classes of freight-car equipment, is that it?

A. Yes.

Q. Where do you get the information contained in column 2? What does that indicate?

A. It is right out of these books here, that is, the number of cars owned. In other words, it is the physical record of freight equipment. When any new cars are purchased we enter them in the books, and when the cars are destroyed or otherwise disposed of, sold, or taken out of service, they are written out of the books. The books are balanced every month as to our total ownership of cars.

Q. Where do you get the information in column 3? Is that from the same sources?

A. That is entered in the books here under the description of the car of any change that might have been made in it.

Q. Do you make an individual check of the record on each car?

A. They make a count from the books of the cars.

Q. As to column 4, is that your own computation?

[fol. 3439] A. Yes, that is percentage.

Q. I take it that the totals are simply the addition of figures appearing above?

A. That is right.

Q. I notice also that the exhibit shows a substantial number of cars, as interchange cars, and then there is a somewhat smaller number appearing "Cars Confined to Home Lines." Are these interchange cars those which move in service beyond the Southern Pacific Lines?

A. Yes, they are cars that were in general service, may be loaded at any point.

Q. As to cars confined to home lines, what particularly is their distinction?

A. The distinction there, these logging cars are used, the majority of them, up in Oregon in the lumber districts. They run on these little branch lines, they don't get off our line.

Q. Are they restricted to branch-line logging service?

A. I couldn't say whether they are restricted to that service or not, but I know they don't get off our line; caboose cars that are used by our crews, they don't get off our line; the narrow-guage line, that is a little narrow guage up in Nevada, they don't get off our line.

[fol. 3440] Q. Has the exhibit been checked against the underlying sources to determine its correctness?

A. Yes, sir, it has been carefully checked.

Q. Will you say whether or not it is true and correct?

A. To the best of my knowledge and belief it is true and correct.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 247.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 247.")

The Court: Mr. Barker, do I understand from your testimony that all of these cars shown in column 3 which purport to be equipped with the friction draft gear are equipped with any particular type of gear, for instance, M-17, or does it vary in different types?

A. They are equipped with any of the recognized types of friction draft gear.

[fol. 3441] Q. And no distinction is made on your records as to what particular type?

A. There might be a few cases where the distinction doesn't show but ordinarily the distinction is made and shows whether it is a Cardwell or Miner or whatever it might be. It is written right in here when the cars are bought and will show the type.

Q. These are equipped with standard draft gears?

A. Yes, sir, you can glance through these books and see them if you like.

Mr. Mason: That is all the questions I have.

Mr. Stronss: You haven't made any distinction on this exhibit, have you?

A. No, because they just asked for friction draft gears and that it what it is.

Mr. Stronss: I have no further questions.

(Witness excused.)

Mr. Mason: We will recall Mr. Sines.

[fol. 3442] B. S. Sines resumed the witness stand for further

Direct examination (continued).

By Mr. Mason:

Q. Mr. Sines, I want to call your attention first to exhibit No. 237. On the front page of exhibit No. 237, the first sheet, summary sheet, it is indicated that forty of the redispatched blocks made a better arrival time at El Paso than the actual blocks, this being the operation during the long train period of April, 1940, when certain trains were operated without regard to the 70-car restriction. I will ask you whether you made an investigation of the record of the actual operation of these particular forty blocks and

what your investigation shows as to the schedule performance?

A. I have made such an investigation and the investigation is based upon the departure time from Tucson, Phoenix, Yuma, and Colton, the points where those particular blocks originate and from which the perishable schedules are computed. In other words, on each one of those forty blocks I went back to the departure from the originating terminal and computed the schedule in due time across to El Paso.

[fol. 3443] Q. What did you find as to schedule performance of the actual blocks?

A. I find as to the actual blocks that they all arrived at El Paso, Texas, ahead of their due time except for five blocks.

Q. This was an actual operation with trains in excess of 70 cars, as the case might be?

A. Yes, during that time we were running long trains.

Q. What as to the five which did not arrive in accordance with schedules?

A. One of them was five minutes late at El Paso; it arrived at 9:25 and it was due at 9:20 P. M. Another one was fifteen minutes late; it was due at 11:30 A. M. and it arrived at 11:45. A third one was fifteen minutes late, due in El Paso at 11:30 and arriving at 11:45 A. M. The fourth one was an hour and thirty minutes late, due at 11:30 A. M. and arriving at 1 P. M. The fifth was two hours and forty minutes late, due at 11:45 A. M. and arriving at 2:25 P. M.

Q. As to the redispatched operation, where these same blocks were operated, and all other trains at the same time were operated, having in mind the 70-car restriction, did you investigate to determine whether these five late arriv-

[fol. 3444] als on schedules made arrival on schedule when they were redispatched?

A. I did.

Q. What was the result of that investigation?

A. The three which were five minutes, fifteen minutes, and fifteen minutes late at El Paso arrived at El Paso ahead of schedule on our short train redispatch. The other two which were considerably later than that failed to arrive at El Paso on schedule on the short train redispatch in the same manner that they failed to arrive there in actual

operation. The last two that I speak of did make somewhat better performance into El Paso, amounting in one case to forty minutes and in the second case to thirty minutes, due to a change in the opposition and interference and operating conditions surrounding the movement of the trains on the redispatch as compared with what had happened in actual operation.

Q. Will you turn to exhibit No. 241?

A. There is one other point I would like to add.

Q. Have you any further explanations to make in connection with exhibit No. 237?

A. We are talking about forty fruit blocks that arrived at El Paso on our short train redispatch in advance of their [fol. 3445] actual time, during which time we were running long trains. Of those forty trains, we had the following number of trains exceeding 70 cars at some time in their operation between Yuma and El Paso—nine trains.

Q. Nine trains of the forty actually had more than 70 cars during the operation between Yuma and El Paso?

A. Yes, the others whose performance was somewhat less favorable on the short train redispatch than on the long train operation were short trains also, that is, they were shorter than 70 cars.

Mr. Mason: Will you read that last answer, please?

(The last answer was read by the reporter.)

The Witness: Short trains in actual performance as well as in redispatch performance.

Mr. Mason:

Q. Their performance actually was somewhat worse than the redispatch performance?

A. Yes.

Q. Then I understand the situation is depicted on exhibit No. 237 correctly?

A. Yes.

Q. And not as you have just stated?

A. Yes.

Q. Is that all you have in connection with exhibit No. 237 [fol. 3446] at this time?

A. That is all.

Q. Will you turn to exhibit No. 241. At pages 3406 and 3407 of the transcript your attention was called by the

Court to the fact that the exhibit shows progressively longer trains in the territory affected by the Arizona law as one moves eastward from Yuma toward El Paso, the Court's question having particularly to do with the showing in the upper or westward block of the exhibit and of course relating to the showing of the redispatch operation. Have you made an investigation to determine just what factor, if any, may have contributed to the difference in the lengths of the redispatched trains particularly eastward and westward of Tucson?

A. I have.

Q. Will you make such explanation as your investigation has enabled you to make?

A. I would like to discuss exhibit No. 241 from the standpoint of a comparison with exhibit No. 215 to show just what happened at Tucson and Gila with respect to westbound operation. In June and August, 1938, there was a slight increase in the number of cars per train westbound at Gila, the average cars per train on the redispatch in- [fol. 3447] creasing from 92.8 to 93.0. There was a slight decrease at Tucson, the average cars per train falling from 93.2 to 92.8. On exhibit No. 241, however, there was a continuing decline in the length of trains at Tucson and Gila. At Tucson the decrease was 2.1 cars and at Gila, 4.7 cars. Upon investigation I found that the principal difference between 1938 and April, 1940, was a slag hauling job that the railroad was engaged in in 1940, during which time we were hauling a considerable number of cars of slag from Douglas, Arizona, to the west end of the Tucson division for ballast purposes. These cars of slag are somewhat heavier than ordinary westbound tonnage, ordinary westbound cars, and resulted in shorter trains being operated out of Tucson. Then when we got to Gila the cars continued through and we set out and emptied them between Gila and Yuma and the cars never got into Yuma. They were later picked up and moved again eastbound into Gila and on into Tucson. The average cars per train shown on both exhibits No. 215 and No. 241 are on the basis of a count made of cars in trains coming into the terminals. These cars having been set out east of Yuma didn't give us an opportunity to include them in our average cars per train. [fol. 3448] Q. Between Gila and Yuma?

A. Between Gila and Yuma.

Q. Because that would be based upon the count as you entered Yuma?

A. Yes. On the other hand, going eastward, the lower part of exhibit No. 241, the cars would be counted into Gila and they would be counted again coming into Tucson.

Q. They would not be counted going out of Tucson eastward?

A. No.

[fol. 3449] Q. Does that account for the difference between the eastward trains into Tucson and the eastward trains out of Tucson to any extent on Exhibit 241?

A. That would influence that difference a little bit, but there is still another reason to assign for that as to 1938 and 1940.

Q. I want to make it clear. This ballast movement in April, 1940, was entirely company material moving for ballasting the right-of-way of the railroad?

A. Yes.

Q. What is the reason for this falling off of 83.2 cars into Tucson and 77.7 cars into Lordsburg, as shown in the lower block, or eastward movement, on Exhibit 241?

A. There again I would like to discuss that from a standpoint of comparison of Exhibit 215. Exhibit 215 indicates that eastward there was an increase in the number of cars per train from Tucson for June and August, 1938, whereas, as Exhibit 241 indicates, there was a decrease in April, 1940, on our redispatch. Both tendencies are shown, although they are not so marked in actual operation. In 1938, and again in 1940, the reason for the change is due to a change in operating conditions with respect to A [fol. 3450] blocks. Those are the perishable blocks originating in the Phoenix territory. In 1938, the A blocks coming into Tucson arrived at such a time that it was possible to consolidate them with T. X. M. Tucson manifest, with cars off the Tucson manifest train at Tucson, and build up the train east of Tucson. In 1940, however, the A blocks were arriving in advance of the T. X. M. trains, or vice versa, the T. X. M. trains were arriving late from California, and it wasn't possible to make that consolidation, and the trains containing A blocks went east of Tucson with relatively light loads and a relatively small number of cars, which would have the effect of pulling down the average cars per train between Tucson and Lordsburg.

Q. Does that conclude your answer on those two exhibits?

A. Yes.

Q. Have you an exhibit in one sheet entitled "Total Road Mileage as of December 31, 1939, and Freight Train Car-Miles and Revenue Passenger-Miles Operated During Year 1939, Class One Railroads of United States and of Certain Railroads Concerning Which Individual Witnesses Have heretofore Testified on the Subject of Operating Costs"?

[fol. 3451] A. I have.

Mr. Mason: May we have this statement marked No. 248 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 248 for identification.

Mr. Mason: How was this exhibit prepared, Sines?

A. This exhibit was prepared from an inspection of the transcript of the record in this case, from an inspection of the exhibits already introduced, and by abstracting figures from preliminary abstract of the I. C. C. statistics of railways for the year 1939.

Q. I take it that the columns A, B, and C are simply transcript references, are they?

A. That is right.

Q. And column D indicates the subject matter or the particular railroad concerning which the witness named in column A testified?

A. That is right.

Q. Now, as to column E, is that also a figure taken from Exhibits or testimony already of record?

A. That is from the exhibit listed in column F.

[fol. 3452] Q. In the corresponding line?

A. Yes.

Q. Now, are these figures in column G taken directly from the Interstate Commerce Commission's published abstract?

A. Yes.

Q. Is that a copy of the same publication referred to in the testimony of Dr. Parmalee?

A. That is right.

Mr. Mason: I think it has already been furnished to Mr. Strouss. If not, it is available.

The Witness: We have an abstract available for his use, yes.

Q. Are the figures in column I likewise taken from the abstract?

A. That is right. The page references in column H apply to both columns G and I.

Q. Do those figures appear, the figures of freight train-miles and passenger train-miles, both appear on those pages?

A. Yes.

Q. Are there any computations on the exhibit other than those which are identified in lines 19 and 20?

A. No.

Q. Will you say whether or not the exhibit has been [fol. 3453] checked and, as to the computations, whether they have been checked?

A. It has been checked and is correct.

Q. And will you state the purpose of the exhibit?

A. To indicate the representation which has been made, the scope of the representation which has been made by the witnesses from foreign lines in this case, and which is found in the percentages in columns E, G, and I, line 20.

The Court: In other words, Mr. Sines, from this exhibit it would appear that there has been produced here witnesses from these sixteen lines other than the Southern Pacific?

A. Including the Southern Pacific.

The Court: I think there are sixteen besides that.

The Witness: Excuse me.

The Court: That represents better than half of the railroad mileage of the United States?

A. Yes.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any further questions?

The Court: No.

[fol. 3454] Mr. Mason: We offer the exhibit in evidence as No. 248.

Mr. Strouss: We have the same objection as made to the original exhibits shown in column F, with the same reasons, without restating them.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 248.")

Mr. Mason: I take it, Mr. Strouss, that your objection is as to relevancy and materiality and not as to competency?

Mr. Strouss: I am not raising any question of competency, so far as failure to produce records is concerned.

The Court: This exhibit, in effect, is a summary of the testimony already introduced in this case?

Mr. Mason: Yes; and, as the witness explained, to indicate whether or not our showing as to the railroads of the United States is comprehensive or otherwise.

Q. Have you before you, Mr. Sines, a statement in four sheets entitled, "Southern Pacific Company, Pacific Lines, Comparisons between Tucson Division, Pacific Lines, and Salt Lake Division, Showing Trends in Freight Train [fol. 3455] and Locomotive Loading, and Effect on Fuel Consumption?"

A. I have.

Mr. Mason: May this statement be marked No. 249, your Honor?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 249 for identification.

Mr. Mason: Did you prepare Exhibit No. 249, Mr. Sines?

A. I did.

Q. From what sources?

A. From forms 521 and 522.

The Court: Do I understand that those are reports submitted to the I. C. C.?

A. No, they are forms regularly compiled in the course of business by the Southern Pacific Company for the guidance of its operating officers and executives, and the figures that are included in forms 521 and 522 are later included in reports to the Interstate Commerce Commission in forms OS-A and in the annual reports. It all fits into the scheme of building up our final figures.

Mr. Mason: Are the forms 521 and 522 regularly prepared in the accounting department?

A. Yes.

[fol. 3456] Q. And from what general sources are they prepared?

A. From the documents of original entry coming into the accounting department, such as the conductors' wheel reports, the conductors' time return and delay reports covering wages, the reports on movement of trains and locomotives from the chief dispatchers' offices, the reports on material and supplies and prices coming from the mechanical and maintenance departments and the time reports from those same departments; and any other basic documents that represent expenditures of money, either for material or supplies, find their way into the figures compiled for forms 521 and 522.

Q. Do the forms 521 confine themselves to cost figures, or do they include also statistics of performance in the shape of locomotive-miles, car-miles, train-miles, and the like?

A. They include cost figures and the statistics which you have mentioned. The cost figures are those figures bearing directly on operation of freight and passenger trains, the direct expenses associated with the cost of performing transportation service.

Q. Does the form 521 bear a particular title?

A. It does and I have looked at it a thousand times, [fol. 3457] but I cannot tell you what it is.

Q. And the Form 522 which you mentioned, was that a predecessor carrying much the same information?

A. That was a predecessor of form 521.

Q. You have used the forms 522 and 521 previously in the preparation of other exhibits which have been offered and received?

A. Oh, yes.

Q. Will you explain what sheet 1 of exhibit 249 undertakes to show?

A. Sheet 1 is a summary of percentage figures which are developed on the succeeding three sheets.

Q. I will ask you to refer back to exhibit No. 179, introduced by Mr. Herbert?

A. Yes.

Q. Is your exhibit 249 for identfication prepared in somewhat the same manner as exhibit 179?

A. In exactly the same manner.

Q. Does it include the same or any additional statistics?

A. Mr. Herbert's exhibit 179 includes those operating costs which are shown on form 521, and which are identified as direct costs and he works with the total of those direct costs. My exhibit singles out the fuel item, per [fol. 3458] forms a similar analysis for fuel consumption.

Q. You don't undertake here to show cost?

A. No.

Q. What are you undertaking to show by Exhibit 249?

A. I am showing the percentage decrease in pounds of fuel per 1000 gross ton-miles.

Q. Your exhibit 249, then, is associated entirely with fuel consumption as related to performance?

A. Yes.

Q. Now, will you go to Sheet No. 2 and I will ask you first whether the figures in the lines for the several years shown in column A, those figures which appear in columns B to J, inclusive, are taken directly from the forms 522 and 521?

A. The figures in columns B to F are taken from forms 521 and 522, and columns G to J are computed, but the figure in column G and H may be found on form 522 and 521 also. In other words, I have checked the form 521 and 522 with respect to those items.

Q. You say column G represents the computations? Is that a division of other figures on the exhibit?

A. Yes, that is a division of the figures in column D by the figures in column B.

[fol. 3459] Q. How do you get the figures in column H? What computation do you make?

A. By dividing column E by column B.

Q. And the figures in Column I?

A. Dividing column E by column C.

Q. And finally the figures in column J, how were they obtained?

A. By converting net tons of fuel in column F into pounds of fuel and dividing by column E.

Q. Then there has to be an adjustment of the decimal point, I think, because this is a figure for a thousand gross ton-miles.

A. That is right.

Q. Now, having the figures above the lines, which horizontally cross the exhibit below the year 1939, what is the next step?

A. The next step was to group the years 1924-1925, 1928-1929, 1930-1931, 1938 and 1939 group the basic figures in columns B to F, the additions for which are shown on the exhibit or appear on the exhibit in the same columns and compute new averages in columns G to J.

Q. Was that done for each of the two-year periods that are shown with the words "Total"?

A. Yes.

Q. Then you show certain percentage changes. Are [fol. 3460] they computed?

A. Then the percentage changes in columns G to J are computed, comparing the first two-year period 1924-1925 with the second two-year period 1928-1929.

Q. Why did you with the Tucson division make a break in 1929 this way.

A. In July, 1930, the limits of the Tucson division were changed and the eastern end of the Tucson division was extended from a point immediately east of Tucson to Lordsburg. The period 1924-1929 therefore embraces a period during which the aspects of the Tucson division remained the same for the entire six years.

Q. Do the 1924 figures take into account the lines which were added in 1924?

A. Yes. The merger of the Arizona Eastern and the Southern Pacific occurred in the fall of 1924, but when our accounting department compiled figures for the year 1925, they restated the year 1924 on the 1925 basis, so that comparisons which they were then making between 1924 and 1925 would be on a comparable basis.

Q. In 1930 you say the change in the Tucson limits took place in the middle of the year?

A. Yes.

[fol. 3461] Q. Are the figures for 1930 restated in the same manner on the 1931 basis?

A. Then in 1931 the 1930 figures were restated so the years 1930, 1931 and subsequent years would be on a comparable basis with respect to the limits of the Tucson division.

Q. In the last line where you say "Total Per Cent Change," how do you get the total percentage?

A. By adding the percentages appearing above, that is, the percentage change for the period 1924-1929, plus the change for 1930 to 1939.

[fol. 3462] Q. Did you treat a decrease as having a minus sign for the purpose of that addition?

A. Yes.

Q. So that these additions are additions in the algebraic sense?

A. That is right.

Q. Going to sheet No. 3, will you state whether or not you followed a similar process there?

A. I did.

Q. Did you likewise follow a similar process on sheet No. 4?

A. That is right.

Q. Has the exhibit been checked and compared against the underlying sources?

A. It has.

Q. Have the computations been checked?

A. They have.

Q. Returning to the first sheet of the exhibit, as I read the exhibit the showing in column A on the first sheet is merely a repetition of what appears in the total line on sheet No. 2; is that correct? The final total line on sheet No. 2?

A. That is right, in column G on sheet No. 2.

Q. Columns G, H, I, and J, I think, are all repeated, are they not, in column A on sheet No. 1?

[fol. 3463] A. That is right.

Q. What is the purpose of exhibit No. 249?

A. The purpose is to establish a comparison in fuel consumption on the Tucson division, Pacific lines, and the Salt Lake division and to show trends in freight train and locomotive loading and their effect on the said fuel consumption.

Q. Does this exhibit afford a foundation for a further portion of your showing?

A. It does.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence.

Mr. Strouss: We make the same objection as previously made in the running objection as irrelevant and immaterial and calling for a conclusion and particularly to that part of the exhibit referring to the Pacific lines and the Salt Lake division.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 249.")

[fol. 3464] The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

Mr. Mason:

Q. Mr. Sines, have you before you a statement in one sheet entitled, "Yuma, Arizona, to Lordsburg, New Mexico, Fuel Consumption Comparisons and Estimated Economy Resulting from Adoption of Long Train Operation"?

A. I have.

Mr. Mason: May we have this statement marked "Defendant's Exhibit No. 250" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 250 for identification.

Mr. Mason:

Q. Did you prepare this exhibit No. 250?

A. I did.

Q. From what sources did you obtain the information shown in columns A, B, and C, lines 1, 2, 3, and 4?

A. Those figures are reproductions from the summary appearing on sheet No. 1 of the exhibit previously introduced, No. 249.

Q. Where did you obtain the figure in line 1, column D? [fol. 3465] A. That comes from summaries produced from our recapitulation sheets covering the June and August redispatch studies and shows what the result of long train operation would be in increasing the cars per train expressed as a percentage.

Q. Is that figure in column D, line 1, a comparison between the average train lengths of the actual and redispatched trains for June and August of 1938?

A. Yes, for the territory Yuma to Lordsburg.

Q. Will you refer back to exhibit No. 226, please?

A. I have it.

Q. Is there any way that the figure in column D, line 1, could be checked against exhibit No. 226, or, if that is not the correct exhibit, some other exhibit to obtain the figure?

A. No, that computation cannot be made directly, but taking the figures shown on exhibit No. 226 and making corrections for the number of cars, for the less number of cars handled on the redispatch than on the actual, the average cars per train for the territory Yuma to Lordsburg can be computed for both actual and redispatch and then the percentage change can be derived therefrom.

Q. That is, the basic figures from which this computation [fol. 3466] can be made are of record on exhibit No. 226, are they?

A. That is right.

Q. Where did you obtain the figure in line 2, column D, on exhibit No. 250 for identification?

A. There is one more feature that should be explained in connection with the figures in line 1, column D.

Q. Will you explain that, please?

A. That is that the percentages in column D refer to the Tucson division. I previously said the territory Yuma to Lordsburg, and it is the territory Yuma to Lordsburg insofar as our redispatching study is concerned, but the change in the average cars per train is the reflection that the redispatch study in the territory Yuma to Lordsburg has on the Tucson division average cars per train for June and August.

Mr. Strouss: You mean by that, including Phoenix?

A. Yes, the entire Tucson division.

Mr. Mason:

Q. Does the figure in line 2, column D, also relate to the entire Tucson division?

A. Yes.

Q. From what sources do you obtain that figure?

[fol. 3467] A. The actual performance for June and August, 1938, comes from the form 521. We then modify the form 521 figures by the changes brought about by our redispatch study and determine what the percentage change would have been actual performance compared with the

result after the changes of the redispatch study had been accounted for.

Q. I take it you have gross ton-miles between Yuma and Lordsburg as shown on sheet No. 2 of your exhibit No. 226?

A. Yes.

Q. Do you include in making the computation which leads to this figure the gross ton-miles made on the other parts of the division?

A. Yes, this is the entire Tucson division.

Q. How do you arrive at the figures in column D, line 3?

A. They are also the actual performance figures for the Tucson division for the months of June and August, 1938, modified by the reduction in locomotive-miles brought about by the redispatching study.

Q. Does this figure represent the comparison between actual and redispatch performance with those factors taken into account?

A. It does, it establishes the percentage relationship be- [fol. 3468] tween actual performance and the performance as it would have been had the long train operation prevailed.

Q. Will you explain how you derive the figure in line 4, column D?

A. The figure in line 4 is a judgment figure, taking into consideration the following factors: between 1924-1925 and 1938-39, the Tucson division increase in gross ton-miles per locomotive-mile was 3.96 per cent; on the Pacific lines it was 20.87 per cent; and on the Salt Lake division it was 36.57 per cent as indicated on this exhibit and on the previous exhibit No. 249. At the same time the improvements in fuel consumption were as shown by the percentages in line 4, comparing the combined period 1924-25 with the combination period 1938-39. We see, therefore, that the improvement on the Tucson division resulted in a decrease in fuel consumption of 12 per cent with an increase in locomotive loading of 3.96 per cent.

Q. Those figures are already of record on exhibit No. 249, are they?

A. That is right.

Q. And simply reproduced here as to columns A, B, and C?

A. Yes; ordinarily I don't like to read figures off the face [fol. 3469] of an exhibit, but I must explain the reasoning that led to the choice of the figure in column D, line 4. At

the same time the percentage improvement in fuel consumption on the Pacific lines was a decrease of 22 per cent accompanying an increase in locomotive loading of 20.87 per cent; while on the Salt Lake division there was an improvement in fuel economy of 26 per cent accompanying an increase in locomotive loading of 36 per cent. We make the redispatch study for June and August of 1938 and on top of the previous economy which had been achieved on the Tucson division we are able to superimpose the economy which will result by increasing the locomotive load.

Q. Then do I understand that line 3, column D, indicates the increase in locomotive load incident to the redispatch?

A. Yes, and whereas a difference of 17 per cent between Tucson division and Pacific lines found in line 3, columns A, B, produced a difference in fuel economy of, roughly, 10 per cent as between Tucson division and Pacific lines, and whereas a difference in locomotive loading of, roughly, 33 per cent as between Tucson division and Salt Lake division produced a fuel economy of 13.4 per cent as between Tucson division and Salt Lake division in column D, line 4, I [fol. 3470] indicate a conservative figure of 10 per cent which would follow the increase in locomotive loading as determined from the redispatch study.

Q. Now as to column E, line 1, column E, the figure shown there, where is that derived?

A. I will have to look at a work sheet to be positive of a figure which I have used and would like to take time to do that. The figure in column E, line 1, is derived by taking twenty-seven thirtieths or nine-tenths of the car-miles produced during April, 1940, and modifying those car-miles by the changes resulting from the April, 1940, redispatch study.

Q. Does this also relate to the performance on the Tucson division for the month of April, 1940, as affected by the redispatch long trains of that period into short ones?

A. That is right.

The Court:

Q. Mr. Sines, is there any relationship between the percentage shown on line 4 of column D and the percentage shown on the same line, column A?

A. There is this kind of a relationship; between 1924-25 and 1938-39 the improvement in fuel performance on the

[fol. 3471] Tucson division is as shown, 12.6 per cent. That has come about because of changes largely in the motive power used on the Tucson division, the appliances and the equipment furnished to those locomotives and the fact that the locomotives themselves now in recent years are bigger, larger, heavier, more efficient locomotives than they were in 1924 and 1925. That same improvement has taken place every place else on the Southern Pacific, our entire locomotive inventory has felt that same change. In addition to that 12.6 per cent on the Tucson division, there is still available another economy resulting from increase in train loading. The increase in train loading we measured, or the possible increase in train loading we measured with the redispatch study. We could still further increase the train load on the Tucson division by the percentage shown in column D, line 3, if it were not for the 70-car law. We have been able to increase the percentage loading on the Pacific lines by 20.87 per cent. We have been able to increase it on the Salt Lake division by 36 per cent. Therefore, I say in addition to the 12.6 per cent already achieved on the Tucson division we can still go out and for the purposes of my study claim at least the percentage improvement in [fol. 3472] column D, line 4, as the result of the increased trainloading still possible if the law were set aside.

Mr. Mason: Is it possible by a straight mathematical computation to obtain a figure in place of the figure which you do show in column D, line 4?

A. No, there is no mathematical computation like two times three are six which will produce that figure in column D, line 4. It is a judgment figure, taking into consideration the factors I have been talking about.

The Court: In effect your statement is that added to the 12.6 decrease in pounds of fuel consumption here there could be added an additional 10 per cent shown in column D on the same line?

A. Exactly.

Q. You have indicated your view of the relationship between those two figures that the Court asked you about. Is there even a more direct relationship between the other percentage figures shown on the same line in columns E, F and G?

A. Having established the figure in column D, line 4, I made the other figures in columns E, F, and G consistent.

In column V we have all the figures in column E representing the result of our first 1940 redispatch study when we [fol. 3473] made short trains out of long trains which had been operated during the period April 4th to 30th. That would result in a decrease in the locomotive loading and a comparable increase in fuel consumption. If a decrease in train loading in column D of 34.5 per cent——

Mr. Mason: (Interrupting) That is an increase I think, isn't it, in column D?

A. Right. If an increase in train loading of 34.5 per cent in column D, line 3, resulted in the figure in column D, line 4, then the decrease in train loading of the amount shown in column E, line 3, would produce the percentage shown in column E, line 4, just as a matter of proportion between the figures in line 3, columns D and E. In other words, one is about one-seventh of the other.

The Court: Do I take it from this exhibit on the Tucson division only oil-burning locomotives are used?

A. Yes.

Mr. Mason:

Q. Is that likewise true in the main as to the balance of the showing on the exhibit?

A. Well, the title of item 4 is, "Percent decrease in pounds of fuel per thousand gross ton-miles," and the ex- [fol. 3474] pression, "pounds of fuel per thousand gross ton-miles," is an item reported on the form 521 and I think that is also on form OS-A which we report to the Interstate Commerce Commission. The Southern Pacific and a few of the railroads in the western territory are oil burners. We convert that fuel oil to coal on ratios established by each one of the carriers themselves. It is not a constant ratio between all of the railroads, and we have continued to report oil as coal in order that all railroads in the United States might be talking in the same terms. The ratio is four barrels of oil equal one ton of coal.

Q. That is so far as our operations are concerned?

A. So far as our operations are concerned. It may be different on other railroads and it is different on some of the other railroads.

Q. I want to ask you this, Mr. Sines, if you had followed out the exact percentage decreases in fuel consumption per

thousand gross ton-miles which are indicated in columns B and C and applied the relationships between the figures in line 4 and the figures in line 3 in columns B and C in deriving the figure in line 4, column D, would you obtain a greater or less figure than you show in column D?

[fol. 3475] A. If I had depended on straight arithmetic, that would have been a larger figure.

Q. How much larger?

A. It would have been 11.2 per cent instead of 10 per cent.

[fol. 3476] Q. I take it, that in arriving at the figures in columns F and G, you followed the same process as you have described for column D?

A. That is right.

Q. Now, to refer to line 5.

A. Yes.

Q. Column H. Is that figure taken from actual records?

A. Yes, that is from the form 521.

Q. And line 6, column H?

A. Wait a minute, form 521 with respect to June and August, 1938, and twenty-seven thirtieths or nine tenths of the fuel consumed for April, 1930, for the figures in columns I, J and K, line 5.

Q. Now, in line 6, where do you get that price?

A. That is the charge-out price which the accounting department has used from month to month and year to year, a statement for which I have here with me.

Q. And that varies, does it, from month to month?

A. Yes.

Q. This figure in column H is the charge-out price, is it, for those two months?

A. That is the average for the two months, yes.

[fol. 3477] The Court: In other words, from an examination of the exhibit, on this particular line it would indicate that your oil was costing you more in 1938 than it was in 1940?

A. That is right.

Mr. Mason: Now, as to line 7, is that a computation?

A. That is a multiplication of the figures in the preceding two lines 5 and 6.

Q. Line 8, where is that taken from?

A. From the figures in the columns above in line 4.

Q. The corresponding figures in column D, E, F and G in line 4?

A. That is right.

Q. As to line 9, is that a computation again?

A. The application of the percentages in line 8 to the cost of fuel oil consumed, in line 7.

The Court: Is a barrel of oil measured in gallons or pounds?

A. Gallons.

Q. How many gallons in a barrel?

A. 42.

Mr. Mason: What is the purpose of exhibit 250 for identification, Mr. Sines?

A. To develop the fuel economy expressed in money in [fol. 3478] 9, columns H, I, J and K, for use in exhibits to follow, to develop the result of adoption of long-train operation.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any further questions?

The Court: No.

Mr. Mason: Have the computations on the exhibit been checked, Mr. Sines?

A. They have.

Q. Will you say whether or not, from the mathematical standpoint, the exhibit is true and correct?

A. It is.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 250.

Mr. Strouss: Objected to as irrelevant and immaterial, calling for a conclusion——

The Court: The objection is overruled. It may be admitted.

Mr. Strouss: —and purely speculative.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 250.")

Mr. Mason: Now, Mr. Sines, will you refer, please, to a statement in one sheet entitled "Lordsburg, New Mexico, [fol. 3479] to El Paso, Texas, Fuel Consumption Comparisons, and Estimated Economies Resulting From Adoption of Long Train Operation?"

A. I have it.

Mr. Mason: May this statement be marked 251, if your Honor please?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 251 for identification.

Mr. Mason: Did you prepare this exhibit, Mr. Sines.

A. I did.

Q. I take it that the block "Total Percentage Change for Two Periods" which appears as columns A, B and C, is likewise a reproduction on the first sheet of exhibit 249?

A. That is right.

Q. Now, as to column D, will you explain how the percentage figures in lines 1, 2, and 3 in that column are obtained?

A. Yes. Whereas the previous exhibit 250 dealt with the Tucson division, main and branch lines, this particular exhibit deals with the main line only, Lordsburg, New Mexico to El Paso, Texas, which is a part of the Rio Grande Division, and which I have set aside from the rest of the Rio [fol. 3480] Grande division operations. From our accounting department, I secured figures of car-miles and train-miles in the territory between Lordsburg and El Paso; I modified those figures by the results of our redispatching study as to cars handled and train-miles operated, and determined what the percentage relationship would be between actual performance and redispatched performance.

Q. In number of cars per train?

A. In number of cars per train.

Q. Did you make the same calculation as to gross ton-miles per train-mile?

A. That is right.

The Court: Why weren't the branch lines included in this territory, what I am getting at, Mr. Sines, would this particular exhibit be comparable to the other division territory where branch lines were included if the branch lines were not included in this territory?

A. At best, the branch line operation represents a very small percentage of any division's operation, and has little effect on the ultimate result. The reason that I took the Tucson division in its entirety for the previous exhibit was that the exhibit 249, which is the basis for these fuel computations, had to be made on a division basis including

[fol. 3481] both the main and branch lines, that is the only way those figures are available.

The Court: Now, if that is true in the Tucson division, why isn't it equally true in the Rio Grande division?

A. Now, to the extent that long-train operation has occurred on the Pacific lines and on the Salt Lake division, the improvements that have resulted in operating costs and fuel consumption on the Pacific lines and on the Salt Lake division are kept at a lower level than they would be if you had to consider the main lines only, on a somewhat lower level. I said just a minute ago that the effect of branch-line operations doesn't mean very much anyway. When we come over to the territory between Lordsburg and El Paso, if I modify main-line operation by a percentage which has been determined somewhere else for main and branch, I produce a less economy in the territory between Lordsburg and El Paso, and it results in showing up the long-train operation in a less favorable light than if I were to take the results of main-line operation only. Further than that, there is no particular branch-line operation for the Rio Grande division that I could assign to the territory Lordsburg to El Paso in any kind of a proportion or re-[fol. 3482] lationship.

Mr. Strouss: There is a very substantial difference in the ratio of branch line operations in the two states however, isn't there?

Mr. Mason: Which two states do you have in mind?

Mr. Strouss: I mean the Tucson division and the Rio Grande.

A. I would hesitate to answer that offhand, Mr. Strouss. I am thinking about a long branch line operation we have on the Rio Grande from Tucumcari to Dawson, which exceeds anything you have here in Arizona so far as branch line operations are concerned.

Q. Your forms 521, would they show the relation?

A. Yes.

Q. They show the branch lines on the two divisions?

A. That is right.

Mr. Mason: As to this particular column 19, Mr. Sines, you are considering, as I understand, only that part of the Rio Grande division which is between Lordsburg and El Paso?

A. Yes.

Q. Is that the only portion as to which there was any substantial modification of train lengths as a result of the [fol. 3483] redispatching study?

A. That is right.

Q. Do I understand that the figures in lines 1, 2 and 3 are the changes in that particular district only as a result of the redispatching study?

A. Yes.

Q. Expressed in percentage relationship of actual to redispatch?

A. That is right.

Q. Now, how do you arrive at the figure in line 4, column D; is that by the same process as explained in connection with the corresponding figure on exhibit No. 250?

A. Yes. The ten per cent in column D, exhibit 250, is the result of an increase in locomotive loading of 34.5 per cent, or roughly thirty-five per cent. By means of the relationship between the figure in column D, line 3, and the 35 per cent, I have modified the ten per cent to produce the figure in column D, line 4, of exhibit 251 for identification.

Q. Then the figures shown here in column D, lines 3 and 4, to express your answer in another way, if I may, are substantially in the same proportion as the figures in column [fol. 3484] D, lines 3 and 4, on exhibit 250?

A. Yes.

Q. Going to columns F and G, will you explain whether or not those computations are of the same character as already explained for column D?

A. They are.

Q. Now, as to the lower block of the exhibit, where do you obtain the figures in line 5?

A. As to column H, I secured that figure from the fuel bureau of our accounting department. They furnished me the fuel consumption between Lordsburg and El Paso in fuel oil. They also furnished me the figure in line 8, column H, in tons of coal, because we do have some coal operation of freight trains between Lordsburg and El Paso.

Q. Were the figures in columns J and K secured from the same source?

A. Yes, and I used there twenty-seven thirtieths or nine-tenths of the figures reported for the month.

Q. What about these prices, first of all, the figure in line 6, that is the same figure as presented on exhibit 250?

A. Yes.

Q. And the coal price, where do you get that?

A. Also from our Fuel Bureau of the accounting depart-
[fol. 3485] ment.

Q. Is that the charge-out price of coal as recorded for the particular periods in question?

A. That is right.

Q. Now, I take it that line 11 is simply a total of the money amounts immediately preceding in lines 7 and 8?

A. Yes.

Q. How do you obtain the figures in line 13?

A. The application of the percentages in line 12 to the money amounts in line 11.

Q. Will you say, Mr. Sines, whether or not, generally speaking, No. 251 for identification corresponds in its construction and in the sources used in its preparation to exhibit 250?

A. It does.

Q. It is simply a separate computation because it relates to the line between Lordsburg and El Paso then?

A. Yes.

Mr. Mason: Have you any other questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any further questions?

The Court: No.

[fol. 3486] Mr. Mason: We offer the exhibit in evidence as Exhibit No. 251.

Mr. Strouss: The same objections.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 251.")

Mr. Mason: Have you before you, Mr. Sines, an exhibit in one sheet entitled "Summary of Annual Savings and Annual Increased Costs in Freight and Passenger Service between Los Angeles, California, and El Paso, Texas," and so forth?

A. Yes, sir.

Mr. Mason: May we have this exhibit marked No. 252 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 252 for identification.

Mr. Mason: Did you prepare Exhibit No. 252, Mr. Sines?

A. I did.

Q. I notice that in the first block of the sheet there is a blank opposite the words "Exhibit Number" following the word "Wages," is that to be filled in?

A. Yes, exhibit No. 229.

[fol. 3487] Q. And again in the next line, "Fuel, Yuma-Lordsburg"; what figure is to be filled in there?

A. 250.

Q. And the next line, "Fuel, Lordsburg-El Paso"?

A. 251.

Q. Are the figures on this exhibit taken directly from other exhibits?

A. They are.

Q. By the way, there is one more blank that I haven't called attention to, line 2, "Passenger Service," exhibit what?

A. 231.

Q. These totals, how are they arrived at?

A. By adding the figures directly above.

Q. Then the figure under freight service identified as a saving for the year, how did you arrive at that?

A. Expanding the figure, total savings for the period in column A by the ratio 17.89 to 100 per cent, which has been developed in previous exhibits, particularly exhibit 229.

Q. Now, on exhibit 226, and I think on 229 as well, you have at the conclusion of the exhibit, it happens to be in line 12 in both exhibits, block 12, expanded a figure for two months to an annual figure by dividing by 17.89?

[fol. 3488] A. Yes.

Q. Have you done the same thing here in this figure which appears in column B of exhibit 252 for identification?

A. Exactly the same.

Q. Now, this figure in line 3, is that the addition of the preceding figures?

A. It is.

Q. And in line 4?

A. It is taken from exhibit 225.

Q. And what does line 5 represent with reference to figures on the exhibit; is it a difference or addition, or what?

A. It is a difference of the figures in lines 3 and 4.

Q. Obtained from subtracting the smaller from the larger?

A. Yes.

The Court: Mr. Sines, this particular exhibit is merely a summary of other figures taken from the exhibits that you have indicated, that are already in evidence?

A. That is right.

Mr. Mason: I take it then, Mr. Sines, the purpose is to bring to one place the figures which may be found in other [fol. 3489] exhibits?

A. Yes, and, as you say there, it occurs to me that you will not find the figure in column A, line 1, wages, on exhibit 229, but you will be able to compute it from the figures on 229. There is an involvement there of the unemployment and pension percentages that the company is paying, which have to be computed separately against trainmen's and enginemen's wages in order to produce the figures shown on Exhibit 252. The data is all available, however, on 229.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 252.

Mr. Strouss: The same objections as heretofore made to exhibits 250 and 251.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 252.")

The Court: We will take our noon recess at this time.

(Thereupon the Court stood at recess until two o'clock P. M. this day.)

[fol. 3490] 2 P. M., February 4, 1941.

All parties being present as heretofore noted, proceedings were resumed as follows:

The Court: You may proceed.

B. S. Sixes resumed the witness stand.

Mr. Mason: Your Honor, Mr. Strouss has asked for the forms 521 for the system and the several divisions for the months and the entire year 1940 and I now have those

documents here. It is quite a bulky set of documents and I will now deliver to Mr. Strouss the 1940 forms 521 I have mentioned; that is, for each division and for the system by months and for the month of December, showing the cumulative totals for the entire year. In addition to that the forms 1232 for the divisions and for the system for the same period are available although not in the courtroom at present and will be made available to Mr. Strouss at the close of the proceedings this afternoon.

Mr. Strouss: Very well.

Mr. Mason:

Q. Had you finished entirely with your explanation of exhibit No. 252, Mr. Sines?

A. Yes.

Q. Have you a statement in one sheet bearing the title, [fol. 3491] "Redispatch Study, June and August, 1938, Extra-territorial Effect of Arizona Train Limit Law between Arizona-New Mexico State Line and El Paso, Texas"?

A. I have.

Mr. Mason: May that be marked No. 253, your Honor?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 253 for identification.

Mr. Mason:

Q. Mr. Sines, on the face of exhibit No. 253 for identification in the footnote there appears a blank space. Will you state what number should be inserted there?

A. 252.

Mr. Mason: May we have that insertion made on the record copy?

The Court: Yes, it may be made.

Mr. Mason: While we are speaking of insertions, may the record copy of exhibit No. 252 bear the insertions which were recited by the witness in his testimony?

The Court: Yes, exhibit No. 252 may show those insertions.

Mr. Mason:

Q. Will you state the sources from which exhibit No. 253 was prepared, Mr. Sines?

[fol. 3492] A. The figures appearing in section No. 1, columns A and B, come from computations made with respect to the actual and redispatch trains for June and August, 1938, and can be made from working papers which I have in my possession.

Q. Are they taken in the first instance from the actual and redispatch train sheets?

A. Yes.

Q. Dividing the train-miles at the state boundary?

A. That is right.

The Court: Does this cover both freight and passenger or only freight?

A. This refers to freight only.

Mr. Mason:

Q. Now as to line 2, is that taken from the train sheets or the white work sheets A?

A. That is taken from the actual and redispatch train sheets originally and appears in my work papers also.

Q. And column C and column D appear to require no explanation in view of the headlines. Did you perform those operations of subtraction and division which are indicated there?

A. Yes, I performed the operations indicated. I might say that the difference between this exhibit and exhibit No. 226 is that exhibit No. 226 is a recapitulation of all of [fol. 3493] the operations from Yuma to El Paso, whereas on exhibit No. 253 we have simply drawn the line at the state line and have accumulated the train-miles east of the Arizona-New Mexico state line. The processes are the same.

Q. The figures in line 3 are totals except as to the per cent figure in column D?

A. Yes.

Q. How do you arrive at the figure in line 4?

A. By expanding the figure in line 3, column C, by the ratio of 17.89 to 100.

Q. Will you explain a little more fully than the exhibit shows how you arrive at the figure in line 5?

A. The footnote indicates the source of the money which entered into the computation producing the figure with the asterisk. The train-miles in the note are taken from preceding exhibits, the first one being exhibit No. 226. Dividing the money, $329,394, by the train-miles saved, produces the average saving per train-mile. That average saving per train mile is therefore made up of the same elements entering into the total saving of $329,394 and reference to exhibit No. 252 will indicate that those elements are wages and fuel saved plus the passenger service saving [fol. 3494] divided by the total freight train miles saving.

Q. Do you consider the offset of the added facilities?

A. With the deduction of the investment cost for siding extensions and locomotive and caboose investment.

Q. Then is the figure in line 5 a multiplication of the .5158 that you obtained by division?

A. Yes, the figure in line 5 is the multiplication.

Q. I will ask you if this figure of train-miles eliminated at the bottom of exhibit No. 253 is the same figure which appears in column B, block XIII, on exhibit No. 226?

A. Yes.

Q. Have those computations been checked?

A. They have.

Q. Insofar as they are computations, will you say whether or not they are true and correct?

A. They are true and correct.

Q. What is the purpose of exhibit No. 253?

A. To establish the amount of saving which can be effected east of the Arizona-New Mexico state line in a round figure by adoption of the long train program.

Q. Does this purport to be a saving accomplished en- [fol. 3495] tirely outside of the state of Arizona?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: Yes. Exhibit No. 252 purports to be annual saving between Los Angeles and El Paso. This is between the Arizona-New Mexico line and El Paso. Is that part of the same thing?

A. The saving on No. 253 is included within the saving on No. 252, yes, but I have made that separation or cleavage at the state line by this method of computation.

Mr. Mason: I think what Mr. Strouss has in mind and I think you have answered, although I will ask you the question in another form. Does the total of $329,394 which you show as a net annual saving on exhibit No. 252 include whatever amount might be saved between the state line and El Paso as indicated by exhibit No. 253 for identification?

A. Yes.

Mr. Mason: Has your Honor any questions?

The Court: In the case of exhibit No. 252, that evidently purports to cover both freight and passenger service whereas you have stated that exhibit No. 253 is exclusively freight.

A. The average takes the whole problem into considera-
[fol. 3496] tion and there is involved a couple of thousand dollars over in California also.

Mr. Mason:

Q. You haven't got those two thousand dollars here on exhibit No. 253, have you?

A. No, it is in No. 252.

Q. I think what his Honor has in mind is this, are these train-miles saving in line 4, column C, associated entirely with freight train operation, are those freight train miles or passenger train miles?

A. That figure is freight train solely.

Mr. Mason: Does that answer your Honor's question? We offer the exhibit in evidence as defendant's exhibit No. 253.

Mr. Strouss: The same objection as to the two previous exhibits.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 253.")

[fol. 3497] Mr. Mason: Have you a statement before you, Mr. Sines, entitled "Locomotive Repair Cost Data For Use in Redispatch Studies?"

A. I have.

Mr. Mason: May this statement be marked defendant's No. 254 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 254 for identification.

Mr. Mason: Did you prepare this exhibit?

A. I did.

Q. From what sources?

A. From a record regularly maintained by the mechanical department, Form No. 4395-A, the total of which is "Record of Locomotive Mileage Shopping and Repairs."

Q. Is that a record regularly and continuously kept in the office of the general superintendent of motive power?

A. It is.

Q. Are you familiar with the manner in which it is kept?

A. Yes.

Q. In what manner did you prepare this exhibit from that record?

A. Well, I should explain the record a little more in [fol. 3498] detail.

Q. Is the record kept according to types and numbers of locomotives?

A. According to types and individual numbers of locomotives, yes.

Q. And what statistics as to individual types and numbers of locomotives does the record show?

A. Since 1932 this form has shown the expense of making shop repairs and the mileage which those locomotives operate, the mileage being accumulated monthly from records furnished by the auditor of equipment service accounts, the repair expenses being furnished by the auditor of disbursements.

The Court: In column A there, you are referring to types rather than to individual locomotives?

A. That is right.

Mr. Mason: Did the record to which you refer in the motive power department show the mileage prior to 1932 by years?

A. Yes.

Q. And by individual locomotives?

A. Yes, sir.

Q. Did it also show the shop repairs by individual locomotives?

A. It did.

Q. Did it show any other class of repairs?

[fol. 3499] A. It showed the running repairs, they were accumulated prior to 1932.

Q. Have running repairs since 1932 been shown by types or classes of individual locomotives?

A. No.

Q. Do you on this exhibit show running repairs, or do you show the shop repairs only?

A. This exhibit is confined to shop repairs only.

Q. Is there any other classification of the repairs other than the shop repairs or running repairs?

A. Not in connection with form 4395-A, and all of the repairs made to locomotives can be classed either as shop repairs or running repairs.

Q. The two terms are not synonymous then?

A. No; the distinction between the two is that when a locomotive is repaired, if it is out of service more than five days, it is a shop repair, if it is less than five days, it is a running repair.

Q. But the repair in each instance is done in the shop?

A. It can be done in the shop or it can be done in the roundhouse or on the road; as to running repairs, they can be made practically anywhere. Shop repairs have to be [fol. 3500] made in the shop.

Q. But if the repair is of such a nature that it can be completed within five days, then it is a running repair?

A. Yes.

Mr. Mason: And in that case, it would not appear in any figures on exhibit No. 254?

A. No.

Q. Now, having the record in its details as you have indicated, Mr. Sines, how did you go about the preparation of this exhibit; are there any further steps to be explained?

A. Yes. I went to the record and selected the first fifteen locomotives on the list of equipment, in each one of these nominal classifications that had been in service continuously for the ten-year period 1930 to 1939 inclusive. I used that method of selection with all except the F-5 locomotives, and as to those I examined the service record of all of our F-5 locomotives and selected the first fifteen which had not been in mountain service.

Q. By "mountain service" you mean service on the Sacramento Division or the Los Angeles Division between [fol. 3501] Los Angeles and Bakersfield, the San Joaquin Division?

A. That is true as to the Sacramento division from Roseville over the mountain to Sparks, from Roseville north to Eugene over the Cascade Mountains. The F-5 locomotives used between Bakersfield and Los Angeles also see service north of Los Angeles and west of Los Angeles, and it was not possible to exclude them in all instances.

Q. Then, having selected 15 of each of these locomotives, what was your next step?

A. I determined the average weight of the locomotives from records in our mechanical department, and then proceeded to abstract the information in columns C and D from a form that I have previously mentioned, 4395-A, and finally determined the figure in column E by dividing the figures in column D by the figures in column C.

Q. Now, when you speak of the net weight of the locomotive in tons, what weight do you include?

A. That is the light weight without fuel or water.

Q. Does that include only the weight on the drivers?

A. No, that is the entire locomotive and tender.

Q. This figure then will not necessarily agree with the [fol. 3502] figures shown in exhibit 5 or exhibit 6 introduced by Mr. Russell?

A. No, there again we had to select individual locomotives, and the record of their weights and the record of the tender weights and make an average of the combination of locomotive and tender. There is a few hundred pounds' difference as between individual locomotives even of the same type.

Q. Exhibits 5 and 6 purport to show weight on drivers. Is that an entirely different figure from the net weight?

A. Yes, the weight on drivers is always considerably less than the total weight of the locomotive.

The Court: That would be true because the tender weight is not included in weight on drivers?

A. The tender weight, also the weight on engine trucks which are the small wheels at the front of the engine, and the trailer truck, which are the small wheels under the cab of the engine, that weight is not included in weight on drivers.

Mr. Mason: Has the exhibit been compared against its underlying sources, Mr. Sines?

A. Yes, sir.

Q. Have you any or all of the documents from which it [fol. 3503] was prepared available or can they be made available?

A. I have all of the forms 4395-A with me in Tucson, and they can be made available to Mr. Strouss with the exception of the three books which are being used currently to post our record from day to day, which is a continuous operation in the mechanical department, and I left those books in San Francisco with the understanding that they can be sent down here on a moment's notice. The rest of them are here.

Mr. Mason: If you wish them, we can make them available.

Mr. Strouss: I don't think I want them.

Mr. Mason: Will you state whether or not the exhibit is true and correct according to these sources?

A. It is.

Q. And the computations have been checked?

A. They have.

Q. Are they correct, so far as you know?

A. Yes.

Q. Will you state the purpose of the exhibit?

A. The purpose is to establish unit costs for shop repairs for locomotives to be used on subsequent exhibits.

Q. Now, Mr. Sines, have you in your prior exhibits in- [fol. 3504] dicating the potential saving, I am referring particularly to exhibits 252 and 253, made any showing of the increased or reduced expense, whichever the case might be, that would be involved if long-train operation were conducted in place of the restricted operation under the seventy-car law in so far as locomotive repairs are concerned?

A. No.

Q. And they are first treated with, then, I take it, in connection with your exhibit 254?

A. Yes, this is the first place they make their appearance.

The Court: A few moments ago, you mentioned the locomotives used on your mountain divisions. I take it that

the cost of repair is greater on such locomotives than it would be on those operated elsewhere?

A. Yes.

Mr. Mason: Have you made a study of that situation, Mr. Sines, with a view to developing the difference in repair costs as to locomotives predominantly used in mountain service and those used predominantly in valley service?

A. I have.

Mr. Mason: Have you any questions on Exhibit 254, Mr. [fol. 3505] Strouss?

Mr. Strouss: Do I understand column B is an average taken from 15 locomotives of each type?

A. Yes.

Q. Did you obtain the figures under columns C and D; are they averages also?

A. No, they are not averages. They are the total quantities, Mr. Strouss, for the entire fifteen locomotives. The fifteen Moguls in line 1, accumulated the mileage in column C, and there was spent on those fifteen locomotives the money in column D for the ten-year period, 1930 to 1939.

The Court: In other words, those are actual figures?

A. Yes.

Q. Taken from the records of the fifteen locomotives of each type that you selected?

A. Yes.

Mr. Strouss: These are the locomotives from the Pacific Lines as a whole and not from any particular division?

A. Yes, they were chosen from the Pacific Lines as a whole, but I purposely excluded those F-5 locomotives which had operated between Roseville and Sparks, and Roseville and Eugene.

[fol. 3506] Mr. Strouss: It doesn't purport to show shop repairs, for example, on the Tucson division solely?

A. No.

Mr. Mason: Are these types of locomotives which have in the past or are now being used on the Tucson division?

A. Each of those locomotives in lines 2 to 7 are in service today on the Tucson division. I don't know whether we have any of those small ones.

Q. You mean the Moguls?

A. The Moguls.

Q. I think there is a preceding exhibit which shows the Moguls assigned here, but I don't know whether it was the Six to Nine class or whether it was some other class.

A. I am quite sure I would be safe in saying it is representative of all those types that are in service today on the Tucson division.

Mr. Strouss: But it is not limited to the types of locomotives in service on the Tucson division?

A. No; it would be impossible to do that for any great period because these locomotives see service all over our system from time to time and year to year. We transfer [fol. 3507] the power all over.

The Court: Mr. Sines, referring to Mr. Russell's Exhibit No. 5, no reference is made here to the type which you designate here on lines 5 and 6 on exhibit 254 as F-1 and F-5, is there?

A. Yes, the 2-10-2 small is the F-1. Refer to the tabulation on exhibit 5.

The Court: Oh, I see.

The Witness: And the 2-10-2 large is the F-5, or includes the F-5.

The Court: I see. That is clear to me now.

Mr. Mason: Has your Honor any other questions on Exhibit 254?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Exhibit No. 254.

Mr. Strouss: The same objection.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 254.")

Mr. Mason: Now, Mr. Sines, do you have in addition to the showing on Exhibit No. 254 of these types of locomotives, any statistics as to the mileage, shop repairs and average shop repair costs per mile for the locomotive of the AC-6 class?

[fol. 3508] A. I have. Fifteen locomotives chosen in the manner I have described for the ten-year period from 1930

to 1939 accumulated a mileage of 6,513,481. That figure might now be written at the foot of column C, Exhibit 254; and for the same ten-year period those fifteen locomotives accumulated a shop repair expense of $1,521,554.76. The average weight of an AC-6 locomotive and tender is three hundred and fifty tons. The shop repair cost per mile for these AC-6's, dividing the 1,500,000 by the 6,500,000 miles is 23.36 cents. That figure could be written in column E.

[fol. 3509] Q. What is the character of the service in the territory where these AC-6's, these fifteen, were principally in use during the ten-year period 1930 to 1939?

A. These fifteen AC-6's, in fact all of the AC-6's that are in service, have been in service in mountain territory, Roseville to Sparks and Roseville to Eugene.

Q. Have you an exhibit in one sheet bearing title, "Redispatch Study, Locomotive Repairs, Yuma, Arizona, to El Paso, Texas; for Period April 4th to April 30th, 1940, Actual Operation Compared with Redispatched Operation Observing 70 Car Restriction and Using Present Power and Short Sidings"?

A. I have.

Mr. Mason: May we have that exhibit marked as Exhibit No. 255" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 255 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 255 for identification?

A. I did.

Q. From what sources was it prepared?

A. The figures in columns A and D were taken from the actual and redispatch train sheets and compilations made [fol. 3510] therefrom and the figures in columns B and E come from the previous exhibit No. 254. The figures in columns C and F are results of multiplying the figures in column A by the figures in column B, and the figures in column D by the figures in column E. There are certain types of locomotives appearing on exhibit No. 255 which are not found on exhibit No. 254. I refer to the type in line 5 and in line 4. They are passenger locomotives principally which were used in freight service occasionally in 1940 and which were used in our redispatched operations also for 1940, but for which I did not compute locomotive repairs

according to the method in exhibit No. 254 because there I attempted to confine that study to freight locomotives entirely. It would have been possible for me to compute the locomotive repairs for those two passenger types of locomotives because the figures are available, but because of the fact that the operation is somewhat different any repair expense computed for a passenger locomotive would hardly be applicable if you used that same locomotive in freight service. Therefore, in assigning a unit of repair cost in columns B and E for those two types, I took the repair cost of the next heaviest freight locomotive, the F-1 in [fol. 3511] line 6, and used that.

Q. Is the E-1 referred to in line 6 approximately the same weight over all as the Pacific and Mountain types in lines 4 and 5?

A. It is a little bit heavier than the Mountain type. The Pacific type is the lightest of the three classes.

Q. What effect, if any, results from the use of a unit cost repair figure for a heavier type in connection with these two passenger type locomotives?

A. The effect on the results of this exhibit would not be appreciable because almost the same quantities are involved on the actual and the redispatch operations. In other words, they cancel out except for the difference in column C, line 5, and column F, line 5.

Q. The difference between column C, line 5, and column F, line 5, is apparently less than nine dollars?

A. That is right.

Q. There is no other effect of including these two with these repair rates which you have shown?

A. No.

Q. There are certain computations otherwise on the exhibit than those multiplications. Will you indicate those [fol. 3512] computations?

A. The columns are footed as indicated and the difference between the total in column F and the total in column C appears in line 10 with the total increase for period.

Q. Do you undertake to show by this exhibit No. 255 for identification any item of cost other than the item of shop repairs?

A. That refers to shop repairs only.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 255.

Mr. Strouss: The same objection as to the preceding exhibits.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 255.")

Mr. Strouss: Mr. Sines, during that period did you have a record of the actual repair costs, do your records show what the actual repairs cost on the Tucson division during that period?

[fol. 3513] A. No, you cannot allocate locomotive repairs to any one division. We have a record for the system, it is the second exhibit from now.

Mr. Strouss: I will wait.

Mr. Mason:

Q. Mr. Sines, I think you stated just before the exhibit was received that this relates only to shop repairs and you have already explained that there are in addition running repairs?

A. That is right.

Q. Is there a system record kept of the total amount of money spent for locomotive repairs, including shop and running repairs?

A. Yes, that goes into our report to the Interstate Commerce Commission, account No. 308.

Q. Is that kept by types?

A. No.

Q. Is there any record presently kept of the total of running repairs by types?

A. No.

Q. Have you made any investigation to determine how much of the total locomotive repair bill during the past several years is included in the totals of shop repairs?

A. Yes.

Mr. Mason: I will defer that question for just a moment. [fol. 3514] I will ask you to turn to an exhibit in one sheet entitled, "Redispatch Study, Summary of Increased Costs, Yuma, Arizona, to El Paso, Texas, for Period April 4th

to April 30th, 1940, Actual Operation Compared with Redispatched Operation Observing 70-Car Restrictions and Using Present Power and Short Sidings"?

A. Yes.

Mr. Mason: May that exhibit be marked "Exhibit No. 256" for identification?

The Clerk: It may be marked.

The Clerk: Defendant's exhibit No. 256 for identification.

Mr. Mason:

Q. Did you prepare this exhibit, Mr. Sines, or cause it to be prepared?

A. I did.

Q. You have certain blanks shown on the exhibit. Will you indicate how those are to be filled?

A. Yes, the first blank should be exhibit No. 236. The next blank opposite "Wages" should have exhibit No. 239 inserted; the third blank opposite "Fuel" should have exhibit No. 250 inserted; the last blank should have exhibit No. 255 inserted.

The Court: Then this exhibit is merely a recompilation of the statistics heretofore admitted in evidence in the exhibits [fol. 3515] you have indicated?

A. That is right.

Mr. Mason:

Q. You simply bring them together in one place and add them for a total, is that the idea, Mr. Sines?

A. Yes.

Q. Is the exhibit true and correct in accordance with the exhibits previously received?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 256.

Mr. Strouss: The same objection as to the preceding exhibits.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 256.")

Mr. Mason:

Q. Mr. Sines, referring to my discussion of shop repairs and running repairs in their relation to the total, I will ask you to refer to a statement in a single sheet en- [fol. 3516] titled, "Relation between Locomotive Shop Repair Costs, Running Repair Costs, and Total Costs." Have you that statement before you?

A. I have.

Mr. Mason: May this statement be marked "Defendant's exhibit No. 257" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 257 for identification.

Mr. Mason:

Q. Did you prepare this exhibit or supervise its preparation?

A. I supervised its preparation.

Q. From what sources was this taken?

A. The total repairs are taken from report to the Interstate Commerce Commission, account No. 308. The shop repairs were secured from the mechanical department which keeps records of the shop repairs in the manner I have previously described in connection with form 4395-A. Having accumulated all the shop repairs, the running repairs are the difference between total repairs and shop repairs.

Q. Then you obtain column B by what process?

A. Deduction or subtraction.

Q. What figures do you subtract?

A. The figures in column A from the figures in column C. [fol. 3517] Q. How do you obtain column D?

A. That is a division of the figures in column A by the figures in column C.

Q. That represents the ratio of A to C, does it?

A. Yes.

Q. How do you obtain the figures in the total block at the foot of the sheet?

A. By dividing the figures in column A by the figures in column C.

Q. I notice there are variations from year to year in the ratios as expressed in column D?

A. That is right.

Q. How are those accounted for?

A. The effect of the economies which were introduced during the depression years when we deferred as much of the heavy work as possible and ran the mileage on the locomotives which were then available and didn't repair them for several months and sometimes even years until the necessity arose for putting them back in service.

The Court: Chickens coming home to roost?

A. That is the reason for the sharp increase between 1933 and 1934.

Mr. Mason:

Q. Are these higher ratios of shop repairs in more recent [fol. 3518] years the performance of those deferred repairs that you spoke of?

A. That and a change in policy with respect to performing shop and running repairs, changes in operations which occur over any ten-year period.

Q. Do I understand that the figure marked "Average" in the right is a straight mathematical average of the figures above or is it a computed figure based upon the three columns preceding?

A. It is a computation based upon the three columns preceding.

Q. What is the purpose of exhibit No. 257?

A. The purpose of exhibit No. 257 is to give a key to the total locomotive repair expense, a part of which has been treated with in connection with exhibit No. 256, No. 255, and No. 254. We could allocate locomotive repairs only as to the shop repair portion of them, but there is in addition to that the cost of running repairs.

Q. Has the exhibit been checked to determine its correctness?

A. Yes.

Q. Have the computations been checked?

A. They have.

Q. Will you say whether or not it is true and correct and in accordance with the underlying sources?

[fol. 3519] A. It is.

Q. Are the annual reports showing the figures in column C either heretofore made available or now available for the use of opposing counsel?

A. Yes, we have them here and they are available at any time.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 257.

Mr. Strouss: The same objection as to the preceding exhibits.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 257.")

Mr. Mason:

Q. Mr. Sines, will you pass to a statement in a single sheet entitled, "Redispatch Study, Summary of Savings, Yuma, Arizona, to El Paso, Texas, for Period April 4th to April 30th, 1940, Actual Operation Compared with Redispatched Operation, with No Restriction and Using AC Power and Long Sidings"?

[fol. 3520] A. Yes.

Q. I notice that this exhibit has certain blanks. Are those to be filled in?

A. That is right.

Q. What figure should be shown in the first line where it says "Freight service, exhibit No. —"?

A. Exhibit No. 242. In the second blank opposite "Wages" insert the number 245; in the third blank for "Yuma-Lordsburg" insert the figure 250; and in the fourth blank, exhibit No. 251.

Q. Do I understand that this is simply a summary much the same as exhibit No. 256?

A. It is.

Q. And simply brings to one place figures which appear on exhibits already of record?

A. Yes.

Q. Has the addition indicated hereon been checked?

A. It has.

Q. Will you say whether or not the exhibit is true and correct?

A. It is.

Mr. Mason: Your Honor, I overlooked having the exhibit marked. I ask that it be marked as "Exhibit No. 258" and [fol. 3521] subject to any questions of counsel or your Honor that it be received in evidence with that number?

The Court: It may be marked for identification.

The Clerk: Defendant's exhibit No. 258 for identification.

Mr. Strouss: I have no questions but I have the same objections as to the preceding exhibits.

The Court: Objections overruled and it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 258")

Mr. Mason:

Q. Mr. Sines, I notice that exhibit No. 256 includes an item for locomotive repairs, whereas there is no such item shown on exhibit No. 258. Will you explain that?

A. The AC-8 locomotives which we used in our redispatch with no restriction and long sidings were built in 1939 and have only seen service since the closing months of 1939. They haven't been in service long enough to establish a repair cost which could be used in this case.

Q. Does the AC-8 locomotive resemble any other locomotive now in service?

A. Yes, the AC-8 locomotive is almost an exact duplicate of the AC-6 to which I have previously testified in connec- [fol. 3522] tion with exhibit No. 254 as to design, tractive effort, the only considerable difference being in total weight, which is 376 tons, as compared with the weight of the AC-6 of 350 tons.

Q. Where is that difference in weight principally found in the two locomotives?

A. In the tender.

Q. You spoke of experience with the AC-6's and I think in your testimony indicated a repair rate for shop repairs. Is that repair rate related to the service in which they have principally been assigned?

A. Yes, that is the way it has to be accumulated, from the service that the engine has seen.

Q. You have also stated that you have made a study to determine the difference in the repair rate accumulated by

locomotives in mountain service as contrasted with those in predominately valley service. Just what did your study in that connection consist of?

A. I examined the entire locomotive inventory of the Southern Pacific to find, if I could, a particular type of engine which had had types in operation in mountain territory and in valley territory simultaneously for any con- [fol. 3523] siderable period and I found that I could make a selection of F-5 locomotives that answered that particular need. I found fifteen locomotives which had not operated in the territory between Roseville and Sparks and Roseville and Eugene to any considerable extent during the whole ten years from 1930 to 1939, and then I also found eight locomotives which had spent most of that ten years in that same territory and I found that those that had operated in the less arduous territory accumulated a repair expense 11.56 per cent less than the locomotives——

Mr. Strouss: (Interrupting) I want to object to this as immaterial and incompetent.

The Court: What is the purpose of it, Mr. Mason?

Mr. Mason: Your Honor, it is along the lines as indicated by your question, that is, to develop that the repair rate for locomotives in valley service has been proved by experience to be less than for similar types in mountain service and to develop that the repair rate for AC-6's in valley service or any service other than in these particular arduous mountain districts would similarly be lower if they were used in valley service. They have not been so used according to the testimony of the witness. That would give us [fol. 3524] an index of the repair rate of the AC-8's because the AC-6's and AC-8's are, as the witness has stated and as Mr. McDonald stated when he was on the stand, substantially the same locomotive having precisely the same characteristics.

Mr. Strouss: It would certainly be pretty remote in determining any costs in Arizona where the witness has testified we have no record of locomotive repairs in this division.

The Court: Yes, I will sustain the objection.

Mr. Mason:

Q. Have you some further explanation in connection with exhibit No. 258, Mr. Sines?

A. I wish to point out that the saving of $28,278 which occurred as a result of the redispatch study from April 4th

to April 30th when we redispatched the long trains which had actually been run into still longer trains is to be added to the figure on exhibit No. 256, $9,331, and which indicates the saving that was actually made when we ran long trains, but under the restriction of short sidings and present power, so that adding those two together there is available just from the items considered on those exhibits themselves, $37,500 in savings in the twenty-seven-day period, April 4th to April 30th, 1940.

Q. Does that figure represent the difference between, re-
[fol. 3525] stricted operation on the one hand and operation with AC power and longer sidings on the other?

A. It does.

Q. For those particular items?

A. Yes.

The Court: We will take our afternoon recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

[fol. 3526] The Court: You may proceed.

Mr. Mason: Mr. Sines, will you take up a statement in a single sheet entitled, "Redispatch Study, April 4th-30th, 1940, Actual Operation Compared With Redispatched Operation, with No Restriction and Using AC Power and Long Sidings, Extraterritorial Effect of Arizona Train Limit Law Between Arizona-New Mexico State Line and El Paso, Texas?"

A. Yes.

Q. Did you prepare the exhibit?

A. Yes.

Q. Will you describe how it was prepared, and from what sources?

A. The mileages in columns A and B were taken originally from the actual and redispatch train sheets, and then from work sheets which I have segregating the train-miles east of the Arizona-New Mexico state line. The train-mile saving, column C, is a substraction, as indicated, of B from A; per cent savings in column D are obtained by dividing the figures in column C by A.

Mr. Mason: By the way, before the witness goes any further, I think I neglected to ask to have this marked. May it be marked Exhibit 259 for identification?

[fol. 3527] The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 259 for identification.

The Court: The blank space in the column below there as to exhibit number, what should that be, Mr. Sines?

A. 258.

The Court: That may be filled in on the original.

Mr. Mason: Now, Mr. Sines, having obtained the figure in line 3, column C, did you go to another exhibit for a multiplier to obtain the figure in column 4?

A. Yes, that came from Exhibit 258, as indicated by the note.

Q. And will you say whether or not the computations on the exhibit are correct?

A. They are.

Q. Has the exhibit been checked against the underlying sources?

A. It has.

Q. Now, I will ask you if this figure in column 4, and the showing on the exhibit in general, is in addition to what is shown on Exhibit 258, or is it a part of what is shown on Exhibit 258?

A. It is a part of the figures on Exhibit 258.

[fol. 3528] Q. And I take it, it is the part which relates to the operation between the Arizona-New Mexico state line and El Paso?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Defendant's exhibit No. 259.

Mr. Strouss: The same objection as to the preceding exhibits.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 259.")

Mr. Mason: Mr. Sines, does this exhibit resemble a preceding exhibit in which you have presented a summary of extra-territorial effect?

A. Exhibit No. 253, which covered the extra-territorial effect, determined by the redispatching study of June and August, 1938.

Q. Did you undertake to show any extra-territorial effect in so far as the redispatching study of April, 1940, was concerned, using present power and short sidings?

[fol. 3529] A. No.

Q. Then this exhibit resembles only Exhibit 253 in so far as it relates to the extra-territorial effect?

A. That is right.

The Court: In that connection, Mr. Sines, I notice that all of these exhibits which the defendant is offering to illustrate the extra-territorial effect has to do with the territory east of the Arizona-New Mexico line and from there to El Paso?

A. Yes.

Q. And I take it, that by their absence of any exhibits, that the extra-territorial effect west is somewhat inconsequential?

A. West of Yuma?

Q. Yes.

A. Yes, inconsequential.

Mr. Mason: That is in so far as freight service is concerned?

A. Yes.

Q. Have you a showing of extra-territorial effect not measured in money necessarily as to passenger service west of Yuma?

A. Yes, the effect on the passenger service is shown quite clearly——

Q. Isn't that the 33-page exhibit, Mr. Sines, that was [fol. 3530] received some time ago?

A. On the exhibit you mention, which is exhibit No. 199, and also on exhibit No. 232. On Exhibit 232 we develop the extra-territorial effect in money as a result of the redispatching study which we make for the entire year 1938.

Q. As relating to passenger service only?

A. That is right.

Q. I take it, then, that in answer to his Honor's question, as to the inconsequential effect of the law west of Yuma, you had in mind freight-train operations?

A. Yes.

Q. Mr. Siner, what circumstance is there that tends to minimize any extra-territorial effect which the law might have west of Yuma in so far as the Southern Pacific Company is concerned, in connection with freight-train operation?

A. The fact that the freight terminal is located at Yuma, Arizona, immediately adjacent to the state line, which is the middle of the Colorado river.

Q. Do you know and, if so, will you state whether freight trains not conforming to the 70-car restriction operate into and out of Yuma?

A. I know that they do.

Q. Do you know whether or not that operation has been [fol. 3531] substantial and continuous for the past several years?

A. It has.

Q. Now, would it be possible to operate these trains from California or from Arizona into California in length greater than the law permits originating them exactly at the state line or halting them exactly at the state line?

Mr. Strouss: I object to that as immaterial, calling for an opinion based on facts not in evidence.

The Court: Objection sustained.

Mr. Mason: I think the facts are in evidence that the line is in the middle of the Colorado river, and I don't think that it is based on facts not in evidence, and I think the witness is well qualified to state whether such an operation would be possible.

Mr. Strouss: It is not such an operation that has ever been prohibited. The evidence is that that operation is permitted; in other words, that you do operate these long trains in and out of that terminal.

Mr. Mason: Now, do I understand that the counsel for the State will agree that the law does not prohibit the opera- [fol. 3532] tion of trains into and out of the Yuma terminal in length exceeding seventy cars?

The Court: Is that what you are driving at, Mr. Mason?

Mr. Mason: I was driving at this point, that the extra-territorial effect west of Yuma obviously, I think it is obvious, it is to me, is overcome only because the Southern Pacific Company has not been compelled to observe the restrictions of the seventy-car law in bringing its Los

Angeles division trains into Yuma or originating its Los Angeles division trains at Yuma.

The Court: Even though that involved a short-train operation in the State of Arizona?

Mr. Mason: It involved a long-train operation in the state of Arizona. It involves operating trains in excess of seventy cars from the line at the middle of the bridge, as the witness testified, for some distance at least into the state of Arizona. I take it, whether it be one foot, 100 yards or 1000 yards, it is in an operation within the state of Arizona, and it is in defiance of the seventy-car law or by sufferance. Now, which is it, Mr. Strouss?

Mr. Strouss: You can figure it out.

Mr. Mason: Why does the State object to our showing on [fol. 3533] this matter unless the State is prepared to take some stand in this matter?

Mr. Strouss: The witness has testified; I am taking the witness's word for what the past operation has been, that they have operated long-trains in there and used that terminal for long-train operation. Now, if there is any speculative testimony here as to what it would be if there was a different operation in there——

Mr. Mason: That is not what I asked the witness. I asked the witness if it was possible from a practical standpoint to originate these trains at the middle of the bridge or stop them at the middle of the bridge.

The Court: Perhaps it wasn't clear.

Mr. Mason: I will ask you, Mr. Sines, is it possible to originate trains for the Los Angeles division at the middle of the bridge over the Colorado river west of Yuma?

A. No, it is a physical impossibility to have a 125-car train exactly at that state line.

Q. To originate there?

A. Yes.

Q. Is it a physical possibility to make the middle of the bridge over the river west of Yuma an arriving terminal for trains from the Los Angeles division, and by that I mean [fol. 3534] trains not conforming to the seventy-car restriction.

Mr. Strouss: I still don't see the materiality of this.

The Court: I will overrule the objection.

A. No, it wouldn't be physically possible to pull a 125-car train up to the state line, and make any kind of delivery without having a long-train operation in Arizona.

The Court: And, as a matter of fact, all of the tracks that are necessary at a division point are located in the state of Arizona at Yuma?

A. Exactly.

Mr. Booth: A literal and technical compliance with the law would compel us to build a terminal on the California side of the Colorado river, would it not?

A. Yes.

Mr. Strouss: I object to that. That is calling for a conclusion.

Mr. Mason: Can you make up and break up trains without an appropriate trackage upon which to do it?

A. No.

Mr. Strouss: You can run them short to the next terminal, can't you?

[fol. 3535] Mr. Mason: I ask that that statement be carefully recorded, because that is a concession by the State that the law has necessarily extraterritorial effect, you can run short trains into your next terminal into the next state, which compels you to conform to the Arizona law in your New Mexico or California operations.

Q. You heard the statement of counsel, did you, Mr. Sines?

A. Yes, sir.

Q. Do you agree with it?

A. That is one way.

Q. That is one way to meet the requirements of the law?

A. That is the way we have been meeting it east of the Arizona-New Mexico state line for about twenty years.

Q. Now, Mr. Sines, your redispatching study for June and August, 1938, related to those months, in 1938 and to the conditions which prevailed during those months, did it not?

A. Yes.

Q. Will you say whether or not the factors which either governed or permitted operations as they took place in 1938 and as you contemplated them for the purpose of the redis- [fol. 3536] patching study are in general still in existence

and operative upon the territory to which the redispatching study of 1938 relates.

Mr. Strouss: Now, what factors are you talking about? That is a pretty indefinite question. I would like to know what the witness is about to testify to so I can at least have a chance to make an objection.

Mr. Mason: All right, Mr. Strouss. We will particularize them.

Q. Mr. Sines, in 1940 and 1941, is the line in the same place as in 1938?

A. Yes.

Q. Are the sidings the same?

A. Yes.

Q. Is the general character of the traffic substantially the same as in 1938?

A. Yes.

Q. Is the volume of traffic in 1940 and so far in 1941 heavier or lighter than in 1938?

A. The volume is considerably heavier in 1940 and 1941 than it was in 1938.

Q. Then comparing 1938 and 1940 or 1941, would the opportunity for savings such as are indicated by your redispatching study be greater in 1940 than in 1938, or less?

[fol. 3537] Mr. Strouss: That is objected to as calling for a conclusion, speculative.

The Court: The objection is overruled. You may answer.

A. The opportunities would be greater.

Mr. Mason: And why is that?

A. Because the volume of traffic is greater, the number of short trains required to handle that traffic is greater, the opportunities to cut down the train-miles and locomotive-miles are greater.

Mr. Strouss: My objection goes to this.

The Court: Yes.

The Witness: The amount of wages is greater in 1940 than it was in 1938, and the amount of fuel consumed was greater in 1940 than in 1938. All of the elements entering into a cost study of this kind are greater in volume and quantity in 1940 than in 1938.

Mr. Mason: Referring to a comparison of conditions in 1940 and 1938, were the wage levels of the employees whose wages were considered in your 1938 redispatching study the same in 1940 as in 1938?

A. The same.

Q. Were the same general types of locomotives used?

[fol. 3538] A. There has been a change in the assignment on the west end of the Tucson division. We are now using F-4's and 5's more extensively, that is, in 1940 we were using F-4's and 5's more extensively than we were in 1938.

Q. Other than where there has been a change, are the locomotives in use in 1940 and in 1938 all of the F type?

A. Yes, F-1's in 1938 and F-4's and 5's in 1940, although locomotives of both types were used in both years.

Q. Will you refer to other factors which had to do with the redispatch, and state what conditions were the same and what conditions were different, if any?

A. Well, we were operating under the same set-up as to perishable schedules generally, although there has been an advance in the arrival time in Chicago, which was amended just within recent months, which has meant a speeding up in the operation between Yuma and El Paso. That didn't have effect however in April, 1940. We always had the Arizona 70-car law in 1938 as well as in 1940.

Q. That condition has not changed?

[fol. 3539] A. No, and that was the principal item that remained unchanged.

Q. There has been no change in the number of men required or used in crews, has there?

A. No, the Arizona full crew law was operative both years.

Q. There has been no change in the limits of the division?

A. No, that remained the same.

Q. Has there been any change in the location of division terminals?

A. No.

Q. Has there been any change in the location or extent of the helper territories?

A. No.

Mr. Strouss: What about your branch lines?

Mr. Mason: Whether or not there has been any change in branch lines?

Q. Does the branch-line operation have anything to do with the redispatching study?

A. No.

Q. Did it have any effect upon the opportunity of operating long trains upon the main line?

A. None.

Mr. Strouss: Would you mind—I would like to know that for my own information, whether there has been any [fol. 3540] change in the branch lines?

A. Mr. Masson's exhibit, detailing branch-line abandonments will show you what has happened up to recent date.

Mr. Mason: It is my impression there has been very little if any change. There is a history of branch-line abandonment for Arizona in the record.

Q. Mr. Sines, on exhibit 259 and as well upon exhibit 253, you show in a unit cost per train-mile saving in the one case of .596 dollars, or 59.6 cents, and in the other 51.58 cents. I will ask you whether that is relatively high or relatively low as a train-mile cost in your experience?

Mr. Strouss: Relative to what?

Mr. Mason: Well, what is the average cost per train-mile for the group of expenses which you stated and which you have mentioned in your testimony previously as showing the direct cost?

A. For the year 1938 the direct costs on the Tucson division, as shown by the Form 521, per train-mile were $1.285.

Mr. Booth: That is freight train-mile?

A. Yes, freight train-mile.

Mr. Mason: What items of expense does that include?

Mr. Strouss: What year is that?

[fol. 3541] A. That is 1938. That includes fuel, enginemen, trainmen, engine house, other locomotive supplies, train supplies and expenses, and does not include locomotive repairs.

Mr. Strouss: Now, is that main line and branch line both?

A. That is the total for main line and branch.

Mr. Mason: Have you any figure for main line only, cost per freight train-mile?

A. No, that figure has not been compiled since 1932.

Mr. Strouss: May I ask, do you have records showing the costs segregated as to the line through Phoenix?

A. No, we don't have.

Q. Not as to trains run or net tons per train or any of those items?

A. We have statistics, Mr. Strouss, but no costs by statistics.

Q. Operating statistics?

A. Yes.

Q. Segregated as to that particular part of the road?

A. Yes.

Q. I wonder if I could get those statistics?

A. You will find them on form 1232 for the territory [fol. 3542] Wellton to Picacho, or it may be Yuma to Tucson by Phoenix.

Q. That only gives gross ton-miles, locomotive-miles and train-miles.

A. That is right.

Q. But not net tons per train?

A. No. Gross tons per train can be computed and gross tons per locomotive.

Q. But not net tons per train, that is what I was trying to get.

A. No.

Q. You have no statistics on that?

A. We don't have in any of the forms we have furnished you or any of the reports we have published. They may be available in the accounting department work papers, I can't answer as to that.

Mr. Strouss: Pardon me for interrupting.

[fol. 3543] Mr. Mason: You say that you obtained cost exclusive of locomotive repairs for main and branch line freight train miles for 1938 in excess of a dollar, did you, or what was the figure?

A. $1.28½.

Q. Whereas you show here for the year 1938, $0.5158. Does your showing on exhibits Nos. 253 or 259 omit some items which you have stated enter into the direct cost?

A. Yes.

Q. Which ones?

A. Such items as engine house, other locomotive supplies, train supplies and expenses. There are included fuel, enginemen's and trainmen's wages.

Q. Is anything included for repairs on exhibit No. 253?
A. No.
Q. Or No. 259?
A. No.

Mr. Mason: Mr. Strouss, I think we had some discussion off the record as to the appearance of chief dispatcher J. A. Day of Los Angeles division whose testimony, if offered, would have served as a foundation for the passenger redispatch study and the exhibits offered by Mr. Sines relating to the passenger redispatch study, and I think at that time [fol. 3544] you indicated you were willing to agree that he need not be called, that it could be stipulated that the necessary foundation had been laid and Mr. Sines might testify as if his testimony had preceded this.

Mr. Strouss: That is right.

Mr. Mason: His testimony insofar as concerns the redispatching study of the passenger trains during the year 1938 would, I understand, be along the same lines as Mr. Baker and Mr. Herrell and Mr. Cassady?

Mr. Strouss: Yes, I think he only had to do with the passenger redispatching study.

The Witness: That is right.

Mr. Mason: With that understanding he was not called to testify.

Mr. Strouss: That is right.

Mr. Mason: I would like to have that understanding in the record and also express my appreciation of your not having required us to call him. In addition to the forms 521 we now have the forms 1232 that you asked for earlier this afternoon. We have two additional exhibits for Mr. Sines, but they are not quite ready.

The Witness: That is right.

Mr. Mason: I would like at this time to withdraw him [fol. 3545] with the privilege of recalling him the first thing in the morning.

The Witness: That depends on our mail plane connections from San Francisco.

The Court: It will not interfere with your cross-examination of this witness if he is withdrawn?

Mr. Strouss: No.

The Court: Very well, you may step aside, Mr. Sines.

(Witness temporarily excused.)

E. S. FEWTRELL was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Booth:

Q. Will you state your name and residence to the reporter?

A. E. S. Fewtrell, Berkeley, California.

Q. What position do you hold with the Southern Pacific Company?

A. Chief clerk to the auditor of equipment service accounts.

Q. How long have you occupied that position?

[fol. 3546] A. Fourteen years.

Q. What is the function of the auditor of equipment service accounts office?

A. Records are kept of movement of all cars and locomotives and all operating statistics of train operation are compiled there.

Q. Does the office of the auditor of equipment service accounts use the conductors' wheel reports in accumulating statistics?

A. The wheel reports are one of the basic and most important records that are used there.

Q. Of course you are thoroughly familiar with what they are and how they are used?

A. Yes, sir.

Q. Does your office make up the statistics of freight train miles and freight car miles monthly as a basis for the reports of the company to the various state commissions and to the Interstate Commerce Commission?

A. Yes, some are made weekly.

Q. Will you state the number of freight train miles and freight train car miles, respectively, in the state of Arizona of the Southern Pacific Company for the month of April, 1940?

A. The total made by all trains, train miles, was 237,018; freight train car miles was 13,173,540.

[fol. 3547] Q. Was a special study of the conductors' wheel reports for that month insofar as it related to freight train operation within the state of Arizona made under your direction for the purpose of ascertaining how many trains

of 70 cars and less were run and how many trains of over 70 cars were run in accumulating the 237,018 freight train miles you have mentioned?

A. It was.

Q. That was made of the wheel reports, was it not?

A. Yes.

Mr. Booth: I will state to counsel we have those wheel reports if he cares to examine them.

Mr. Mason: They are a part of the documents used in connection with the April, 1940, redispatch study.

Mr. Strouss: I don't want them.

Mr. Booth: I don't think they would be very much nourishment for anyone.

Q. Will you state the number of freight train miles of trains of 70 cars and less during that month?

A. Freight train miles, 199,761.

Q. How many freight train car miles did those trains of 70 cars and less accumulate?

[fol. 3548] A. 9,993,262.

Q. How many freight train miles were accumulated by trains of over 70 cars?

A. 37,257.

Q. And how many freight train car miles did they accumulate?

A. 3,180,278.

Q. To make the record complete, although it can be done without the witness testifying to it, what is the statistical average of cars per freight train of a train of 70 cars and less obtained by dividing those freight train miles into freight train car miles?

A. 50.03.

Q. And of trains of over 70 cars?

A. 85.36.

Q. And the grand average of all trains?

A. 55.58.

Mr. Booth: No further questions.

Mr. Strouss: No questions.

Mr. Booth: May the witness be excused?

The Court: Yes, he may be excused.

(Witness excused.)

The Court: It is so near the closing hour, if counsel desires to adjourn until morning, we will be at recess until ten o'clock tomorrow morning.

(Thereupon the court stood at recess until 10 A. M., February 5, 1941.)

[fol. 3549] February 5, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

Mr. Booth: If the Court please, at the conclusion of yesterday's session, Mr. Fewtrell was the last witness on the stand, and we find in checking over the work sheets that one figure he gave, namely, the figure at the top of page 3548 of the transcript showing the number of freight car-miles in the trains of seventy cars and less operated during the month of April, 1940, in the state of Arizona was incorrect. I would like to call him to the witness stand to ask him to correct it. It will necessitate a change in three figures that he gave yesterday.

The Court: All right.

E. S. Fewtrell was recalled to the stand, and testified further as follows:

Direct examination (Continued).

By Mr. Booth:

Q. Mr. Fewtrell, on page 3547 of the transcript, at the bottom of the page, I asked you the question, "How many freight train car-miles did those trains of seventy cars and [fol. 3550] less accumulate?" And your answer, line 1, page 3548, was "9,993,262." Now, do you desire to make a correction in that figure?

A. Yes, sir.

Q. Well, what is the correction?

A. The corrected figure is 10,533,262. The average cars per train is 52.73.

Q. And the grand average of cars per train?

A. The freight train car-miles for all trains was 13,713,540. Average cars per train, 57.86.

Q. There was no change in the figures of the trains of over seventy cars?

A. No, sir.

Mr. Booth: I will ask, if the Court please, that the reporter copy this table in the transcript so that we will have it all in one place.

Mr. Strouss: That is perfectly agreeable.

The Court: The reporter may copy it into the record.

(The table referred to reads as follows:)

[fol. 3551] "FREIGHT TRAIN AND FREIGHT TRAIN CAR MILES

STATE OF ARIZONA

April, 1940

	Freight Train Miles	Freight Train Car Miles	Average Cars Per Train
Trains of 70 cars and less	199,761	10,533,262	52.73
Trains of over 70 cars	37,257	3,180,278	85.36
Total	237,018	13,713,540	57.86"

Mr. Booth: We will call Mr. John J. Sullivan.

[fol. 3552] JOHN J. SULLIVAN was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Booth:

Q. Your name is John J. Sullivan?

A. That is correct.

Q. Your residence is what?

A. San Francisco, California.

Q. What official position do you have with the Southern Pacific Company?

A. I am assistant manager of personnel with headquarters at San Francisco.

Q. What, in a general way, are the duties of the personnel department of which you are assistant manager?

A. The general duties are the matter of employee labor relationships and the negotiation of working agreements with the various crafts, but along with those duties I have been assigned numerous special duties.

Q. When did you first enter the service of the Southern Pacific Company?

A. April 26, 1904.

Q. Will you briefly state the respective services in which [fol. 3553] you have been engaged for the Southern Pacific Company since that time and where they occurred, on what divisions, and for what lengths of time approximately?

A. I originally entered the service on April 26, 1904, as a yard clerk at Lordsburg, New Mexico, then on the Tucson division. Two months later I was transferred to Tucson. Between April 26, 1904, and February 28, 1913, I was employed as a yard clerk at Lordsburg and Tucson, as a clerk and timekeeper, train master's clerk, division accountant, chief clerk to assistant superintendent, chief clerk to the division engineer, and assistant chief clerk to the superintendent of the Tucson division at Tucson. From March 1, 1913, to December 31, 1915, I was a student in general railroad operation on various operating divisions and the general office departments at San Francisco.

Q. Right there, what did the company do in respect to this student course it had at that time?

A. At that time it was the policy to select certain employees, generally graduates of colleges, to train them for subordinate officer positions. Ordinarily the course extended over a period of three and a half or four years and embraced services in the various operating departments, [fol. 3554] for instance, as a student section foreman, student yardman, brakeman, fireman, working in the division shops and general shops with machinists and boiler-makers, in the various statistical departments of the general office including the freight accounts, disbursement accounts, and equipment service accounts; service with various officers; a period in the freight traffic department on the compilation of tariffs and the quotation of rates to the public; service in the general manager's office, in the statistical department, and, finally, as a student assistant train master on one of the operating divisions.

Q. Will you proceed with your duties from January 1, 1916?

A. From January 1, 1916, to July 24, 1917, I was a special inspector and accident and statistical clerk in the office of the vice-president and general manager at San Francisco; from July 25, 1917, to February 28, 1918, I was detailed from the Southern Pacific Company as a general

agent of the American Railway Association, council of national defense, at Camp Cody, Deming, New Mexico.

Q. Having to do with what?

A. The movement of supplies and the concentration of [fol. 3555] troops at Camp Cody. From March 1, 1918, to October 7, 1919, I was in the United States Army as a first lieutenant and captain of engineers, serving in France from June 7, 1918, to September 15, 1919, as assistant superintendent and division superintendent of railway transportation service. October 8, 1919, to February 29, 1920, I was a Southern Pacific Railroad representative on the San Francisco terminal car service committee of the United States Railroad Administration. From March 1, 1920, to July 15, 1920, I was supervisor of transportation of the northern district, which comprised the territory from San Francisco north to Portland and east to Ogden, Utah, with headquarters at San Francisco; from July 16, 1920, to July 22, 1920, I was train master of the Stockton division with headquarters at Tracy, California; from July 23, 1920, to November 30, 1922, I was train master of the Tucson division with headquarters at Yuma, Arizona; from December 1, 1922, to July 31, 1923, I was terminal train master of the Los Angeles terminal; from August 1, 1923, to June 30, 1934, I was train master and assistant superintendent of the Shasta division and the Shasta district of the Sacramento division after consolidation with headquarters at Dunsmuir, California; from July 1, 1934, to [fol. 3556] September 30, 1935, I was special representative of the general manager at San Francisco; from October 1, 1935, to February 28, 1938, I was assistant superintendent of the Salt Lake division with headquarters at Ogden, Utah; from March 1, 1938, to March 31, 1939, I was assistant superintendent of the western division with headquarters at Stockton, California; from April 1, 1939, to October 31, 1939, I was assistant to the general manager with headquarters at San Francisco; on November 1, 1939, I was appointed to my present position, that of assistant manager of personnel.

Q. Now, as accident and statistical clerk in the office of the vice-president and general manager during the period from January 1, 1916, to July 24, 1917, was it a part of your duties to be familiar with the system of reporting railway accidents of various kinds to the Interstate Com-

merce Commission with the classification of those accidents and all matters connected therewith?

A. It was.

Q. In your various capacities as assistant superintendent of the Shasta division and the Salt Lake division, was it a part of your duties to, and did you, familiarize yourself with the same requirements and documents I have mentioned?

[fol. 3557] A. It was my duty.

Q. Have you done any special work, any special assignment, in connection with the preparation and presentation of statistical summaries based either on the published statistical reports of the Interstate Commerce Commission or on the form T's, which we will explain presently, filed with that Commission?

A. I have, I prepared such statistical showings from which I testified in the so-called "first Arizona Train Limit case," the Nevada Train Limit case, and have prepared similar tables for presentation at the trial of this suit.

[fol. 3558] Mr. Booth: Did you on behalf of the Association of American Railroads prepare and present a series of statistical tables bearing on the results of operation of railroads of the United States from the safety standpoint at the hearings before the House Committee on interstate and foreign commerce in the spring of 1938 on Senate Bill No. 69, the so-called Train Limit Bill?

A. I did.

Q. Did you prepare the series of tables, statistical tables bearing on relative safety of operation by years, by districts, and so on, which are referred to in the findings of the Court in the Nevada Train Limit case adopted by the Court in its opinion?

A. I did.

Q. How long have you been engaged in the preparation, in special preparation for testimony in this case?

A. Approximately seven months.

Q. Practically all of your working time?

A. Yes, sir.

Q. You have been here in Tucson since the trial of the case opened?

A. I have.

Mr. Strouss: If the Court please, his testimony as to [fol. 3559] what the Nevada court based its findings on is a conclusion. I move that it be stricken.

Mr. Booth: The figures are referred to in the findings at great length.

The Court: It may be stricken. I don't see that that is material.

Mr. Booth: Have you prepared a photographic copy of seventeen sheets of the rules of the Interstate Commerce Commission governing monthly reports of railway accidents effected January 1, 1922?

A. I have prepared a seventeen-sheet photostatic copy, but it consists of more than the seventeen sheets of the rules of the Interstate Commerce Commission.

Q. Of what does it consist?

A. It is a photostatic copy of the title page and the rules governing the monthly report of railway accidents, commencing at page 11 and continuing to page 36 of the printed rules and regulations of the Interstate Commerce Commission covering the reporting of accidents.

Mr. Booth: We ask that this be marked for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 260 for identifica- [fol. 3560] tion.

Mr. Booth: I will state, your Honor, that the entire book from which this is taken is in evidence. It was introduced, I think, as Exhibit No. 9, as a part of exhibit No. 9, but in the interest of brevity in the record, we thought we would take what we considered the material parts and put them in this more convenient form.

Q. Did the Interstate Commerce Commission require reports of railway accidents prior to the adoption of these rules?

A. It did. This particular set of rules is referred to as the 1922 revision.

Q. And took effect when?

A. On January 1, 1922.

Q. Have you access to the copies of all reports made by the Southern Pacific Company under these rules and kept in its offices?

A. I have; those copies that have been retained.

Q. The copies that were retained?

A. Yes, sir.

Mr. Booth: I will offer Defendant's Exhibit No. 260 for identification in evidence.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and [fol. 3561] marked "Defendant's Exhibit No. 260.")

Mr. Booth: Will you describe, briefly, for the record the general groups of reportable accidents required by the Interstate Commerce Commission to be reported by railroads under its jurisdiction?

A. On page 14 of the rules, which is sheet 3 of exhibit 260, it will be found that railway accidents are grouped under three classes—train accidents, train service accidents, and non-train accidents. Train accidents cover accidents with or without casualties arising in connection with the operation or movement of trains, locomotives or cars that result in damage to equipment or other railway property in excess of $150, including the cost of clearing the wrecks. Train service accidents cover only fatalities or injuries to persons where damage to the equipment or property does not exceed $150. Train service accidents include all fatalities, and it includes injuries to employees where disability exceeds three days, and injuries to all other persons except employees where the disability exceeds one day. The group of non-train accidents are those that in no way are involved in the operation of trains, cars, or locomotives, and include the group that are found in the operation of shops, [fol. 3562] stations, and other non-train facilities of the railroads.

Q. Now, when you use the word "casualties" in these statistics, you mean both deaths and injuries in the case of an employee resulting in absence from service over three days?

A. That is correct.

Q. In the case of a passenger exceeding one day?

A. That is correct. The term "casualty" includes fatalities as well as reportable injuries.

Q. For the sake of illustration, suppose there is a derailment of train which results in damage to equipment of $100 and in no deaths or personal injuries, that would not be reportable under these rules?

A. That would not be a reportable accident.

Q. If it results in damage to equipment of $150 or more, but no casualties, including deaths, it would be reportable as what?

A. No, the damage must exceed $150, damage of even $150 would not be reportable.

Mr. Booth: Amend the question to read that way.

A. It would be reportable as a train accident.

Q. And if there was a death or casualty resulting from the accident you have just mentioned, it would still be [fol. 3563] reportable as a train accident, would it?

A. That is correct.

Q. Now, let us suppose that in this derailment that resulted in damage of equipment of $150 or less, there was the death of or injury to some person, how would that be reported?

A. That would be reported under the rules as a train service accident.

Q. What about the death of a trespasser?

A. That would be reported as a train service accident. The fatalities or injuries to all persons regardless of their occupation or other relationship is reportable under the rules, the only distinction in the rules being this: An injury to an employee is not reportable unless disability exceeds three days. All other persons except employees are reportable if the disability exceeds one day.

Q. Now, is there anything else to which you desire to call attention in this exhibit No. 260?

The Court: Well, Mr. Sullivan, if there was no damage whatever to any railroad property, but there was an injury to an employee, say, or even a trespasser, that would be listed under train service accidents?

[fol. 3564] A. That is correct. As to the fatalities, I might invite attention to this: A person receiving injury from which death results in less than 24 hours is reported, and required to be reported by the rules of the Commission as a person killed; if the death results subsequently to the expiration of twenty-four hours, under the rules of the Commission the person is reported as one injured and as a subsequent fatality.

Mr. Booth: Does the Commission in its rules break these groups of accidents down into a number of sub-classifications?

A. I does. There is a very extensive sub-division of the causes and sub-causes of both train accidents and train-service accidents.

Q. Is that in the book of rules itself, which has been introduced here as part of exhibit No. 9?

A. It is.

Q. Does the Commission annually publish a statistical report and summary, including its comments of the accidents reported for the preceding calendar year?

A. It does.

Q. You have just handed me accident bulletin 107, summary and analysis of accidents on steam railways in the United States subject to the Interstate Commerce Act, [fol. 3565] Calendar Year 1938. Is that the latest publication of this character which is available?

A. It is.

Q. The Commission has not yet released its annual accident bulletin for 1939?

A. It has not, so far as I know.

Mr. Booth: You are familiar with this, of course, Mr. Strauss?

Mr. Strauss: Yes.

Mr. Booth: I would like to show it to the Court.

Q. Does the Bureau of Safety of the Interstate Commerce Commission itself investigate railroad accidents throughout the United States?

A. It does.

Q. Generally speaking, in what cases does it conduct an investigation?

A. The more serious collisions and derailments, and collisions with motor vehicles where employees or passengers or other persons on the train are killed or receive serious injury.

Q. Almost always the accident is one in which one or more deaths have occurred as a result of the accident; is that correct?

A. Generally that is true, but they don't investigate all [fol. 3566] of them.

Q. Does the Commission issue quarterly summaries of the results of those investigations?

A. It does.

Q. Have you with you available for the inspection of counsel a file of the annual statistical reports of the Inter-

state Commerce Commission similar to report 107 for the year 1923 to the year 1938, inclusive?

A. I have.

Q. You have just handed me a pamphlet entitled "Interstate Commerce Commission, Bureau of Safety, Summary of Accident Investigation Reports, No. 79, January, February and March, 1939." For how long a period have you a file here in Tucson and available to the inspection and use of counsel of these summaries of accident investigation reports?

A. From the year 1927 to the year 1939, inclusive.

[fol. 3567] Mr. Booth: I have just handed his Honor for his inspection and not as an exhibit the quarterly summaries just referred to.

Q. Have you prepared an exhibit, Mr. Sullivan, consisting of six pages giving copies of certain forms filed with the Interstate Commerce Commission and required to be filed with them by railroads?

A. I have.

Mr. Booth: We ask that this be marked for identification as "Defendant's Exhibit No. 261."

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 261 for identification.

Mr. Booth:

Q. What is the first page of this exhibit, Mr. Sullivan?

A. It is an extract from the rules of the Interstate Commerce Commission which appear on pages 22 and 23 of the printed rules, paragraphs 15 to 19, inclusive.

Q. Dealing with what?

A. Dealing with the forms and arrangement of the monthly reports of accidents to the Interstate Commerce Commission.

Q. What is the second page of this exhibit No. 261 for identification?

A. Page 2 is the yellow form identified by the Interstate [fol. 3568] Commerce Commission and on the form itself as form V. The form is the verification of the other forms and is included as a part of the monthly report. It includes, in Section A, report of summary of all non-train casualties to employees on duty that are reportable; also

includes the oath of the authorized officer of the carrier who submits the report to the Interstate Commerce Commission.

Q. What is the third page?

A. The third page is the form T report on which is reported all reportable train and train service accidents.

Q. These form T reports when accumulated at the end of the month are attached to form V and sent to the Interstate Commerce Commission, is that correct?

A. They are arranged in accordance with rules, all of the form T reports covering train accidents being assembled first and immediately following the sheet 1 or the verification report, then followed by all form T's covering the train service accidents and each of these particular groups are further arranged according to the particular group according to the type of train accident or the type of train service accident reported.

[fol. 3569] Q. Do the records of the Southern Pacific Company show since the adoption of the 1923 rules it has followed the mechanics of reporting as you have described them?

A. Yes.

Q. What is the fourth page?

A. The fourth page is the so-called "supplementary form T" covering additional information required in connection with accidents at public highway grade crossings and became effective January 1, 1937, the blank form on page 4 of this exhibit being the 1939 revision, there having been some changes year after year in this particular form.

Q. Prior to 1937, when a train collided with a vehicle at a public grade crossing and a casualty resulted or damage resulted to the train in excess of $150, was that reported to the Interstate Commerce Commission?

A. Yes, it was reported on form T and is still reported on form T. There is no change in the mechanics of reporting that particular type of accident.

Q. There are highway grade crossing statistics in the published reports of the Commission back as far as, we will say, 1923?

[fol. 3570] A. That is correct.

Q. In fact you have used those in making up an exhibit which will be offered later?

A. I have.

Q. What is the fifth page of this exhibit No. 261?

A. The fifth page is known as form R and it is a report required by the Interstate Commerce Commission in connection with any reportable train accident due to a failure of any kind in a rail. In other words, that form is supplementary to any form T that may be made of any train accident that was due to a rail failure.

Q. You spoke a little while ago of subsequent fatalities. Is that form of report covered on page 6 of this exhibit?

A. It is.

Q. Does the Southern Pacific Company retain in its files and have you had access to the filed copies of these reports as they have been filed from time to time since January 1, 1923?

A. I have had access to them at different times during the past years, but the office filed copies of form T reports are not retained permanently or, I should say, indefinitely, but I have had access to certified photostatic copies that were [fol. 3571] obtained from the Interstate Commerce Commission for the years 1923 to 1935, inclusive, and I have the retained office filed copies of the form T reports as far back as 1929, either 1929 or 1930.

Mr. Booth: We offer exhibit No. 261 for identification in evidence.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 261.")

Mr. Booth:

Q. There have been referred to in connection with the testimony of other witnesses the Interstate Commerce Commission statistics on railways in the United States for the years 1923 to 1939, inclusive. Are you familiar with those statistics?

A. I think you mean 1938.

Q. 1938, yes.

A. I am quite familiar with that statistical publication.

Q. Have you prepared a series of exhibits which, for convenience, we will call the "national exhibits" dealing with various phases of casualties on the Class I railroads of the United States from the years 1923 to 1938, inclusive?

[fol. 3572] A. Yes, both casualties and train accidents.

Mr. Booth: I have handed the clerk an exhibit in one sheet entitled "Casualties to All Classes of Employes on Duty Sustained in Train and Train-Service Accidents, Class I Railroads of the United States, Reflected by Statistics of the Interstate Commerce Commission, Years 1923 to 1938, Inclusive," which we ask to have marked "Defendant's Exhibit No. 262" for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 262 for identification.

Mr. Booth:

Q. From what sources was this exhibit prepared?

A. The information in columns B and C representing total car-miles and total train-miles was obtained from the Statistics of Railways of the United States, the complete reference being shown at the foot of the exhibit. Columns D, E, F, and G appear in the Interstate Commerce Commission Annual Accident Bulletins, the reference being shown at the foot of the page of exhibit No. 262.

Q. Those are all official publications of the Interstate Commerce Commission?

A. They are.

Q. The computed figures in this exhibit were made by [fol. 3573] you?

A. They were. Items 7, 14, 19 to 23, inclusive, are also calculations made by me.

Mr. Strouss: Will you repeat that, please?

A. Items or lines 7, 14, 29 to 23, inclusive, are also calculations made by me.

Mr. Booth:

Q. Is this exhibit true and correct?

A. It is.

Q. Does it not only include employees engaged directly in the operation of trains and locomotives but also includes other employees, injury cases?

A. It does if they receive their injury in train or train-service accidents.

Q. Will you give some illustrations of other employees that it includes?

A. It includes car inspectors and car repairers working around train yards where the movement of trains, loco-

motives, or cars is involved; it includes employees of the maintenance of way department, bridge and building department, signal department working on the track and structures, or that type of employees who may be traveling to and from their headquarters to point of work on track vehicles such as velocipedes, hand cars, motor cars, or similar travel of those employees from one point of work to [fol. 3574] another point of work during their tour of duty where they may have received injury through the operation of locomotives or trains; clerical employees, such as yard clerks out in the yards who are required to take the numbers of cars in trains where they may have received injury by the operation of trains or locomotives or moving cars; it includes the entire group of employees both on and off the train who may receive injury or suffer death through the operation of trains, locomotives, or cars.

Q. It does not include the so-called "nontrain" class of accidents?

A. It does not.

Q. In calculating the rates in the four columns headed "Casualty Rate Per," what bases have you used?

A. In column I, I have used the rate based on a million car-miles which is a recognized measurement of the occurrence of casualties to the movement of a given amount of traffic; in column J, a million train-miles; column K, a million locomotive-miles; column L, a million man-hours, which is a recognized basis of measurement of the occurrence or exposure of employees to injury.

Q. In the case of many employees covered by this ex- [fol. 3575] hibit, there would be no car-miles, train-miles, or locomotive-miles that could be made applicable to them, is that correct?

A. That is partially true. No car-miles or train-miles are accumulated in connection with, for instance, yard or terminal operation, but locomotive-miles are accumulated.

Q. What employees would be included in the computation on the basis of man-hours that would not be included if you had confined the study to locomotive-miles, car-miles, and train-miles, just in general?

A. Generally, any reportable train or train-service accident that might occur in a terminal yard, there would be no train-miles or car-miles against which the occurrence of the casualty could be related; but man-hours are calculated

and maintained for all classes of employees and locomotive-miles are calculated and maintained for yard operations. That was my object in showing the four bases so that the complete picture would be shown based on all of the recognized bases of measuring the occurrence of casualties.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: Yes. When you said that these columns I, J, K, and L are on recognized bases of calculation, are [fol. 3576] those your own calculations or are those figures taken from the accident bulletins?

A. No, they were calculated by me. The basic figures as to the absolute number of casualties are from the accident bulletins and I calculated the various rates.

Mr. Strouss: That is all the figures in either of those columns?

A. That is true.

Mr. Booth: This can be checked on the face of the exhibit?

A. Yes, they can be checked mathematically and you may find the casualty rates based on man-hours and locomotive-miles in some of the tables of the accident bulletins.

The Court: Then I take it that the Interstate Commerce Commission does not promulgate a casualty rate as you figured it in these columns?

A. Yes, they do, your Honor, they calculate casualty rates based on million man-hours but many of their tables include in that rate the non-train accidents.

The Court: You have made the segregation?

A. I have made the segregation so it would eliminate the non-train accidents and only show the casualty rates for [fol. 3577] train and train-service accidents which are the only type involved in train or locomotive operation. I may state that this is only a series of exhibits prepared in somewhat similar form, and as I shall offer the exhibits they will break down to the various class of employees.

By Mr. Booth:

Q. This is the first of the series?

A. That is correct.

Mr. Booth: If neither counsel nor the Court has any further questions, I will offer the exhibit in evidence.

Mr. Strouss: No further questions.
The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 262."

Mr. Booth: I ask that this second national exhibit be marked "Defendant's Exhibit No. 263" for identification.
The Court: It may be marked.
The Clerk: Defendant's exhibit No. 263 for identification.

By Mr. Booth:

Q. Before we pass to it, I would like to ask the witness to describe what this exhibit No. 262 shows in the progressive movement in the average casualty rates on all Class I railroads of the United States from the year 1923 to 1938, [fol. 3578] inclusive?

A. In the first place, I prepared the showing not only as to individual years but in order to show a proper cross-section of cycles of years; I have prepared it so that in addition to the years a comparison may be made with two six-year cycles and a four-year cycle, the first period being from 1923 to 1928; the next period, six years, 1929 to 1934; and the next period being from 1935 to 1938. This will permit not only of a comparison and examination of the trend of casualty rates year by year but it also permits a comparison of a recent consecutive period of years with preceding periods of years. On lines 7, 14, and 19, average casualty rates have been calculated in columns I, J, K, and L. These are not averages of averages, but a calculated average based on the information shown on line or item 7 in columns B, C, D, and E, representing the car-miles, train-miles, locomotive-miles, and man-hours and the casualties reported in column H. With that information shown, it is not difficult to calculate the percentage of decrease in the casualty rates which are shown as lines or items 21, 22, and 23. For instance, on line 21 under column I it will be observed that the casualty rate for the period 1929-1934 [fol. 3579] compared with the earlier six-year period, 1923-1928, has decreased 57.74 per cent. Likewise, the average for the last four years shown compared with the immediately preceding period, 1929-1934, has decreased 27.37 per cent, and on line 23 the casualty rate, or the average casualty rate for the four years, 1935-1938, compared with

the earliest six-year period has decreased 69.39 per cent. In a similar manner, the corresponding decrease may be found in the casualty rate based on train-miles shown in column J, locomotive-miles shown in column K, and on a man-hour basis shown in column L.

[fol. 3580] Mr. Booth: Putting the illustration another way, the average for the four years ending in 1938, which is shown by line 19, column I, would mean that an average of 31.23 casualties occurred in those four years to the movement of one car one hundred million miles or one hundred cars a million miles, is that correct?

A. That is correct.

Q. And those four years an average of 8.77 casualties occurred in the movement of the average train for a million miles?

A. That is correct, that is shown in column J.

Q. And on a man-hour basis that the average casualty rate was 3.18 casualties in one million man-hours?

A. That is correct.

The Court: Mr. Sullivan, how were these casualties reported prior to the year 1923?

A. They were reported in the same manner and on the same basis except that additional subdivisions of the so-called Code Causes were made. In other words, apparently, after the experience of a number of years, the Interstate Commerce Commission decided that there should be further segregation as to specific causes of casualties, both train and train service.

[fol. 3581] The Court: That is when they adopted these 1922 rules?

A. That is true, but I know of my own knowledge that the same type of accident on the same disability basis was reported to the Interstate Commerce Commission in the year 1916 when I was handling that matter in the general manager's office.

The Court: May I ask, will subsequent exhibits cover the period prior to 1922?

The Witness: Prior to 1923?

The Court: 1923, I mean.

A. No, they will not. They all begin at 1923.

Mr. Booth: Would the fact that you have taken four years in the block represented by line 19, and six years in each

of the other blocks represented by lines 7 to 14 in your opinion impair the validity of the comparison between the blocks?

A. No, because you can select any period of consecutive years you want for comparative purposes.

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which the witness was recalled to the stand, and proceedings were resumed as follows:)

[fol. 3582] The Court: You may proceed.

Mr. Booth: Mr. Sullivan, speaking of the three days' or more disability, more than three-day disability of an employee to make the case a reportable accident, there is another limitation besides that, is there not?

A. Yes, the rules provide that the accident is reportable if the disability in excess of three days occurs within the ten days immediately following the occurrence of the accident. In other words, there must be more than 72 hours' disability within the 240 hours immediately following the occurrence of the accident.

The Court: Mr. Sullivan, is there a time limit within which the individual must die in order to be counted as killed?

A. Yes, the person injured must die within 24 hours after the occurrence of the accident to be counted in the statistics as a person killed. If death occurs after 24 hours the statistics show it as a person injured, but it is reported as a subsequent fatality.

Mr. Booth: Are those both shown on sheet 11 of your exhibit No. 260, those requirements you have just testified to?

A. On sheet 11 of Exhibit 260, which is a reproduction of [fol. 3583] page 30 of the rules at the top, this reference is shown: "Killed. Any person killed in an accident at the time of its occurrence, or so seriously injured as to die within 24 hours thereafter, should be reported as killed. Note: See Section 19 for instructions relative to injuries that subsequently result in death." Section 19 appears on sheet 8 of exhibit No. 260 and is a reproduction of page 23 of the Rules. It states: "Form F (Subsequent fatalities). If, as the result of an injury, a person dies more than 24

hours after the occurrence of the accident, the casualty should be reported on a Form T as an injury, with full details as required by the provisions of the form, and in addition, a memorandum of the death should be given on Form F in accordance with the requirements of that form. This additional report is to be made in connection with the report for the month in which the accident occurred, if practicable; otherwise it should separately accompany the first monthly report filed after the death has come to the knowledge of the carrier. A single Form F may contain reports of more than one such fatality, provided all persons included therein were injured during the same month. A. [fol. 3584] Form F is not required in relation to a non-train accident."

The Court: Well, Mr. Sullivan, assuming that a person was injured in train operations and actually didn't die for two or three years later, but there was a connection between the injury and subsequent death, would you still report it on Form F?

A. Yes, sir, if the death was directly due to the original injury. I have no knowledge of any cases where as much as two years have expired, but I do know of Form F's having been prepared at least a year after the occurrence of the accident.

Q. But the Commission prescribes no time limitation on it?

A. No, sir.

Mr. Booth: The requirement as to the reporting of employees and other persons injured in reportable accidents is shown in the second column on sheet 11 of exhibit No. 260, a reproduction of page 30 of the Rules, is that correct?

A. That is correct.

Q. Now, turning to Exhibit 263 for identification, was this exhibit made from the same sources as Exhibit 262?

A. It was.

Q. And does it show the same information as is shown [fol. 3585] on Exhibit 262, except that it is limited to a smaller number of classes of employees?

A. It is limited to a certain class of employees and there is some limitation in the casualty rate shown on the exhibit.

Q. The limitation is expressed in the title as being "casualties to road trainmen and enginemen on duty; all classes

of service, sustained in train and train-service accidents," is that correct?

A. That is correct.

Q. That would include casualties to road freight, road passenger and work-train service, would it not?

A. That is correct.

Q. What does the term "road train-men and enginemen" include?

A. Road trainmen and enginemen includes conductors, brakemen, flagmen, baggagemen, engineers and firemen.

Q. Engaged in passenger, freight, or work-train service?

A. That is right.

Q. Is there any classification of employees known as a helper which this would include?

A. On some railroads, not very many any more, they [fol. 3586] have what they call a helper to a fireman. If an injury should occur to a fireman's helper, that would be included.

Q. Do we have anything of that sort?

A. Not on our railroad.

Q. Does this include train baggagemen on passenger trains?

A. It does.

Q. Does it include hostlers at terminals taking care of engines, taking them to and from the roundhouse?

A. No.

Q. Now, column D is headed "Man-Hours worked by Road Trainmen." Does that include enginemen as well as trainmen?

A. It does. The Interstate Commerce Commission throughout, where they refer to trainmen, includes conductors and brakemen as well as engineers and firemen. In other words, column D includes all of the man-hours for all of the classes of employees shown in the title of the exhibit.

Q. Or the footnote?

A. Or in the footnote.

Mr. Strauss: What did you mean by "throughout," the Interstate Commerce Commission "throughout" when they say "trainmen"?

[fol. 3587] A. When they refer simply to the term "trainmen," referring to accident bulletin No. 107 for the year 1938, page 107, second column, this reference is made: "The

term trainmen in this bulletin includes engineers and motormen, firemen and helpers, conductors, brakemen and flagmen engaged in passenger, freight, yard, or work-service, also train baggagemen, but not hostlers." A similar reference appears in every accident bulletin from 1923 to 1938 inclusive.

Mr. Booth: Do the same explanations that you gave with respect to the construction and computations in exhibit 262 apply to exhibit 263?

A. Yes.

Q. In other words, it is identical with 262 except for the limited number of employees that it covers as compared with exhibit No. 262?

A. And the bases of measurement, and one basis of measuring the casualty rate.

Q. Are locomotive-miles excluded from 263?

A. It is.

Q. Why?

A. Because all of the classes as shown in the title of the exhibit and the footnote, any casualties may relate either to train-miles or man-hours, the basis of measuring exposure to injury, or car-miles, the measurement of casual- [fol. 3588] ties to the movement of a given amount of traffic, so there was no necessity of showing locomotive-miles in this exhibit, because yard trainmen and yard enginemen are not included in Exhibit 263.

Mr. Booth: Any questions, Mr. Strouss.

Mr. Strouss: No questions.

Mr. Booth: We offer the exhibit as defendant's Exhibit 263.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 263.")

Mr. Booth: Have you any comments on this exhibit other than what you have said about it already and about the preceding exhibit?

A. Nothing except that I would like to direct attention to the trend, to the downward trend of casualty rates as shown in columns H, I and J from 1923 to 1938, and the figures on lines 21, 22, and 23 in the respective columns H, I and J, which shows the percent of decrease in the casualty rates.

comparing the four-year period, 1935-1938, with the average rate in the period immediately preceding it and with the earliest period shown on the exhibit. For instance, line 23 [fol. 3589] shows a decrease in column H of the casualty rate measured on a car-mile basis of 68.03 per cent, comparing the latest period shown with the earliest period shown on the exhibit, and similarly for the column I and column J. You will note that the trend shows a casualty rate of 73.52 casualties per million car-miles in column H for 1923, whereas, in 1938 it was only a fifth of that or 14.57 casualties per million car-miles.

Q. Have you prepared a third exhibit in this national series entitled "Casualties to Road Freight Trainmen and Enginemen on Duty Sustained in Train and Train Service Accidents, Class 1 Railroads of the United States, Reflected by Statistics of the Interstate Commerce Commission, Years 1923 to 1938, Inclusive"?

A. I have.

Mr. Booth: We ask that that be marked Exhibit 264 for Identification.

The Court: It may be so marked.

The Clerk: Defendant's Exhibit No. 264 for identification.

Mr. Booth: Are the sources of this exhibit shown in the footnotes?

A. They are.

Q. Are they the same sources as those from which Ex- [fol. 3590] hibit 263 was prepared?

A. Yes, sir.

Q. And is the exhibit arranged identically in all respects as the arrangement of Exhibit 263?

A. Yes, sir.

Q. What further limitation of classes of trainmen and enginemen on duty is contained in this exhibit 264 for identification?

A. 264 is confined to road freight trainmen and enginemen on duty.

Q. Does that include passenger?

A. It doesn't include passenger.

Q. And work trains?

A. Yes, it includes work trains because road freight trainmen and enginemen man work trains.

Q. Were the computations in this exhibit and the preceding exhibit made by yourself?

A. They were.

Q. I think I neglected to ask you whether all of the others and also whether this exhibit is true and correct, to the best of your knowledge and belief?

A. This and those are.

Q. These exhibits are your personal work, not made by someone else?

A. They are my personal work.

[fol. 3591] Mr. Booth: Any questions, Mr. Strouss, on 264?

Mr. Strouss: No questions.

Mr. Booth: We offer this in evidence.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 264.")

Mr. Booth: Have you any comments to make on this exhibit, Mr. Sullivan?

A. I want to call attention to the downward trend on each of the bases of measurement or the casualty rates shown in H, I and J from the years 1923 to 1938, also the percentage comparisons made and shown on lines 21, 22 and 23 under the respective casualty rate columns. For instance, in column H for the year 1923, the casualty rate applying to road freight trainmen and enginemen on duty was 70.6 casualties per million car-miles, and it had decreased to 13.56 casualties per million car-miles in 1938.

Q. In one hundred million car-miles?

A. A hundred million car-miles.

Q. The decrease by blocks would be from 50.68 in the first six years to 22.01 in the second six years to 16.09, all per one [fol. 3592] hundred million car-miles in the last four years?

A. That is correct.

Q. Is there any statistical advantage of comparing the statistics of this character by blocks rather than by individual years?

A. Yes.

Q. Would it tend to iron out any inequalities of individual years?

A. Yes, because casualties have no regularity in their occurrence, and in order to get a true picture it is necessary

to take a period of three, four, five or six years, and strike an average in order to find a true trend of experience.

Q. Have you prepared another in this series of national exhibits which still further limits the employees covered by the exhibit?

A. Yes.

Mr. Booth: We have handed the clerk one sheet entitled "Casualties to Road Freight Conductors, Brakemen and Flagmen on Duty Sustained in Train and Train Service Accidents, Class 1 Railroads of the United States, Reflected by Statistics of the Interstate Commerce Commission, Years 1923 to 1938, Inclusive." I ask that it be marked Exhibit 265 for identification.

The Court: It may be marked.

The Clerk: Defendant's 265 for identification.

[fol. 3593] Mr. Booth: Are the sources of this exhibit correctly shown in the source notes?

A. They are.

Q. Was this exhibit, like the others, prepared personally by yourself?

A. It was.

Q. Do you believe it is true and correct?

A. Yes, sir.

Q. You made the computations yourself?

A. Yes, sir.

Q. And abstracted the figures from the reports yourself?

A. That is correct.

Q. In what respect and only in what respect does this exhibit differ from the preceding exhibit No. 264?

A. Exhibit No. 265 does not include road enginemen; that is, road engineers or firemen or firemen helpers, if there were any, and it is confined solely to road freight conductors, brakemen, and flagmen, as indicated in the title.

The Court: Just a further breakdown of the previous exhibit?

A. That is correct, your Honor.

Mr. Booth: Have you any questions, Mr. Strouss?

[fol. 3594] Mr. Strouss: No questions.

Mr. Booth: We offer this in evidence as defendant's exhibit No. 265.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 265.")

Mr. Booth:

Q. Have you any comments to make on this, Mr. Sullivan?

A. The same comments apply equally to this exhibit as to the previous one. The casualty rate on the three bases, the downward trend from 1923 to 1938, and the comparisons on the average for the various groups of years as shown on items or lines 21, 22, and 23.

The Court: This exhibit would indicate, would it not, Mr. Sullivan, that your casualty rate on the conductors, brakemen, and flagmen as shown by exhibit No. 265 is slightly less on a percentage basis than where you group larger classifications together? For instance, the previous exhibits Nos. 263 and 264 and also No. 262, down in column H, lines 21 to 23, would indicate that these percentages on this exhibit No. 265 are slightly lower than the other larger groups?

A. The casualty rates become lower in each succeeding [fol. 3595] exhibit because certain classes of employees are eliminated. It does not necessarily mean there is any difference in the casualty rate as applying to a particular group. For instance, if we should go further with exhibit No. 265 and eliminate the brakemen and flagmen, the casualty rate would be lower for the conductors because the casualties in each case are related to the same basic measuring stick; in other words, the same train-miles, the same car-miles. So, finally, if you would only have left one particular group, the casualty rate for that group would be much lower than the total of all employees included in the original group.

The Court: Because your measuring stick is the same for all?

A. That is correct.

Mr. Booth:

Q. The table in all of these exhibits headed "Comparison of Average Casualty Rates" is the table of percentages of decrease and not percentages of rates, is it not?

A. It is a percentage of decrease based on the casualty rates for the respective groups of years.

Q. But not the casualty rates themselves?

A. That is right.

Q. Those casualty rates are shown in the columns pre-
[fol. 3596] ceding?

A. That is right. In other words, from line 1 to 20 in every case that is the casualty rate. Lines 21 to 23 are percentages comparing the casualty rates in the periods with other periods.

Q. Have you prepared a further exhibit headed, "Casualties to Road Freight Conductors, Brakemen and Flagmen, Train-Service Accidents Caused by Sudden Stop, Start, Lurch or Jerk of Locomotive, Car or Train, All Railroads of the United States"?

A. I have.

Mr. Booth: We ask that this — marked "Exhibit No. 266" for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 266 for identification.

Mr. Booth:

Q. Under the rules of the Commission on the reporting of accidents, will you call attention in the record to the code cause known as "sudden stop, start, lurch or jerk of locomotive, car or train"?

A. In the rules which appear in exhibit No. 9 from pages 37 to 52, inclusive, under the rules governing monthly reports of railway accidents to the Interstate Commerce Commission, the Commission has assigned code of causes for
[fol. 3597] train accidents and train-service accidents. These code causes are used in the annual accident bulletins in preparing their various statistical tables. Under "train-service accidents" on page 51 of the rules, appears Code Cause 7007 which covers casualties resulting from sudden stopping, starting, lurch, or jerk of locomotive, car, or train not elsewhere provided for.

Q. Will you indicate to the reporter what portion of that you have just stated should be included in quotation marks as a quotation from the rules?

A. All that I have just read beginning with "7007" and ending with the word "for" of the phrase "not elsewhere provided for." The following should be quoted, "7008,

sudden application of brakes, improper handling of air." "7009, sudden application of brakes, air hose bursting, parting or otherwise defective." "7010, sudden application of brakes, other defective air brake equipment."

Q. Which of those code causes you have just read into the record are covered by this exhibit No. 266 for identification?

A. 7007, 7008, 7009, and 7010, as shown at the foot of the exhibit.

[fol. 3598] Mr. Booth: Your Honor, we have filed this with the reporter in blueprint form and will ask permission if the exhibit is received to substitute a planograph copy.

The Court: You may have permission to do that.

Mr. Booth:

Q. What classes of employees does this exhibit include?

A. Road freight conductors, brakemen, and flagmen.

Q. On trains of all lengths?

A. Yes, sir.

Q. Is any segregation made by the Interstate Commerce Commission as to trains of different lengths?

A. No segregation is made by the Commission.

Q. I mean in its statistical reports?

A. No, they make no segregation.

Q. That is true of all of its reports on which these tables are based?

A. That is correct.

Q. But the form T reports show, do they not, or should show in each case the length of a frieght train in which an accident occurred which is reported on that report?

A. Yes, the form T carries a space for showing the number of cars in a train.

[fol. 3599] Q. If you have access to the form T reports, you can ascertain the number of cars in the train at the time of the accident as reported by the company?

A. That is right, by reference to item 18-B on form T report.

Q. But you say the Commission itself does not classify trains into lengths at all?

A. It does not in their statistics.

Q. Is that true of passenger as well as freight trains?

A. Yes, sir.

Q. Is there any way from the statistics published by the Interstate Commerce Commission in its annual accident bulletins to determine what proportion of any particular class of train or train-service accidents occurring on road freight trains fell into this arbitrary division of more than 70 cars or 70 cars or less?

A. Will you read that, please?

(The question was read by the reporter.)

A. It is not possible.

Q. Is there any discussion in any of those annual accident bulletins of freight train lengths?

A. I have never seen any.

Q. I am speaking of the annual bulletin, you have read [fol. 3600] all of them, have you not?

A. I have read them all. I have never seen any such reference.

Q. Referring to this exhibit No. 266, columns B and C, which relate to car-miles and train-miles as shown in the headings, are taken from the sources shown in the footnotes?

A. That is correct.

Q. Columns D, E, and F are taken from the sources shown in the footnotes?

A. D and E are; F are additions made by me.

Q. Columns G and H and lines 7, 14, 19, 20, 21, 22, and 23 are calculations made by yourself?

A. That is correct.

Q. And are true and correct to the best of your knowledge and belief?

A. They are.

Mr. Booth: Have you any questions, Mr. Strouss?

Mr. Strouss: The code classification where an accident falls under the code classification is determined from the form T report, isn't that true?

A. Yes, the Interstate Commerce Commission, Bureau of Statistics, based their statistics on an examination of the form T reports submitted by the carriers.

[fol. 3601] Mr. Strouss: And the form T report is based upon the employees' information furnished to officials of the company who prepare the form T report?

A. The information on the form T in most cases is the information furnished by the employee himself, providing it is correct.

Mr. Strouss: What do you mean by that? If an employee who was involved in an accident makes a report, the official making the form T report to the Interstate Commerce Commission reserves the right to determine whether that employee's report was correct?

A. All reports to the Interstate Commerce Commission are made after investigation of the facts because the Interstate Commerce Commission rules require that the management submit the reports under oath and it is their duty under the law and the rules to see that the reports reflect the facts.

Mr. Strouss: As they determine them?

A. Yes.

Mr. Strouss: There are, of course, forms required to be executed and filed by the employee involved in the accident?

A. Yes, the rules require the preparation of accident re-[fol. 3602] ports covering all accidents.

Mr. Strouss: What is that form?

A. It is employee's report of accident, the form blank has been changed over a period of years. If I am not mistaken, it is 2611.

Mr. Strouss: The Code Causes 7007, 7008, 7009, and 7010 are your personal selection of the code classification which cover this particular subject and that no other code classifications do cover it?

A. It is my selection, but I have had the benefit of the assistance and suggestions of the employees who offer statistics of this character. They have felt that these were the controlling causes so it is not altogether my judgment but it is my opinion that these correctly include all of the so-called "sudden stop, start, lurch, or jerk of locomotive or train."

Mr. Booth:

Q. That is in train service?

A. In train-service accidents. As I explained before, these are train-service accidents. There is no comparable code cause prescribed by the Interstate Commerce Commission for train accidents of this type.

Mr. Strouss: That is all.

Mr. Booth: We offer this exhibit in evidence as defendant's exhibit No. 266.

[fol. 3603] Mr. Strouss: I object to it as incompetent, irrelevant, and immaterial, based upon matters not in evidence and upon conclusions and not the best evidence.

The Court: The objection is overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 266.")

Mr. Booth:

Q. Have you prepared an exhibit entitled, "Casualties to Passengers on Trains in Train and Train-Service Accidents, Class I Railroads of the United States, Reflected by Statistics of the Interstate Commerce Commission for the Years 1923 to 1938, Inclusive"?

A. I have.

Mr. Booth: We ask that that be marked "Exhibit No. 267" for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 267 for identification.

The Court: Before you go into that, the Court wants to ask a few questions on exhibit No. 266 in the light of Mr. Strouss' objection. Do I understand, Mr. Sullivan, that this particular exhibit, particularly referring to columns D and E, that you exercised your own judgment in selecting what [fol. 3604] accidents fell into those classifications or were these figures obtained from the reports to the Interstate Commerce Commission?

A. The figures are included in the statistics of the Interstate Commerce Commission under those particular code causes and including only the statistics applying to road freight conductors, brakemen, and flagmen. The exhibit was prepared and introduced in anticipation of the contention that is always made in support of a limitation of freight cars in trains, that the trains of certain lengths, in this case of over 70 cars——

The Court: (Interrupting) I am not so concerned with the purpose of it. My question has to do with the accuracy of the classifications.

A. The figures are correct and are not my selection of any particular figures in these code causes. They are all of the

casualties shown by the Interstate Commerce Commission in their statistics under those particular code causes which they have prescribed and shown for road freight conductors, brakemen, and flagmen.

The Court: What did you mean when you said a moment ago in answer to a question from Mr. Strouss that you had had the benefit and opinion of—did I understand you to say employees?

[fol. 3605] A. I have listened to them testify in these train limit law suits and they offer in support of their contention the casualties occurring under these particular code causes.

The Court: We will cross that bridge when we get to it, but what I am concerned with now is what discretion did you attempt to exercise in the matter of selecting from the various types of accidents to road freight conductors, brakemen, and flagmen the figures shown here in these columns, D and E?

Mr. Strouss: May I interrupt just a minute, one thing that might help the Court, in my asking questions and I think in response to questions from Mr. Booth, you have referred to code causes which I don't think have been explained to the Court.

Mr. Booth: It was explained in the record. Does your Honor have the bulletin before you?

The Court: Yes.

Mr. Booth:

Q. Mr. Sullivan, will you take the Interstate Commerce Commission bulletin for 1938 and refer to the page?

A. On page 58 of the accident bulletin under the title, "Table No. 80, Miscellaneous Train Service Accidents not Elsewhere Classified," will be found certain code causes at [fol. 3606] the extreme left of the page.

The Court: What do you mean by "code causes"?

A. Code causes are code numbers that have been assigned by the Interstate Commerce Commission under their rules and in their statistics for the purpose of showing and classifying and separating the figures which would represent the cause of an injury.

The Court: That is shown on that page 58 by all of those numbers on the left giving the various types of causes of injuries sustained?

A. That is correct. You may go back further, this is a general breakdown of all the casualties. The breakdown of

train-service accidents begins on page 47. This is simply one group.

Mr. Mason: Isn't this the case, if an accident as indicated by the form T is shown to be due to sudden stopping, starting, lurch, or jerk of locomotive, car, or train not elsewhere provided for, it is assigned code number 7007?

A. Yes, but it would be assigned to code 7007 by the Interstate Commerce Commission, not by the carrier.

Mr. Mason: And it is listed or included under the number which appears opposite Code Cause 7007 under table No. 80 [fol. 3607], on pages 58 and 59 of the accident bulletin for 1938 and corresponding tables and pages for earlier issues of the accident bulletin:

A. That is correct.

Q. Similarly, as to 7008, 7009, and 7010?

A. That is right and under the particular class of employees that is shown at the top of the column, and for the purpose of this exhibit under road service, freight conductors in two columns showing the killed and injured, and brakemen and flagmen in the two following columns.

The Court: What I am getting at, might accountants differ in their views as to which one of these particular lines should or should not be included in this exhibit?

A. The title of the exhibit shows the casualties in train-service accidents resulting from sudden stop, start, lurch, or jerk of locomotive, car, or train, and all a statistician or anyone else familiar with this type of statistics need do is to start from the beginning of the train-service accidents code causes and select those that clearly indicate that the casualty was a result of a sudden stop, start, lurch, or jerk, and you will find that 7007 to 7010 include that particular type of accident.

[fol. 3608] The Court: Possibly I would follow you a little easier if you would take the year 1938 for which bulletin No. 107 was issued and substantiate the figures you have shown on this exhibit No. 266 as to that particular line?

A. Exhibit No. 266 are the figures combining Code Causes 7007 to 7010 as indicated at the foot of the exhibit. If the Court will please refer under freight service to conductors and then to column, brakemen and flagmen, if you make an addition of those killed you will find that the total is two. If you add the eight sets of figures, four appearing under conductors and four appearing under brakemen and flag-

men, it will equal the total, 316, shown for 1938 in column E of the exhibit.

The Court: We are now only concerned with conductors and brakemen?

A. In freight service, yes, sir.

The Court: I believe I follow you.

Mr. Mason: In order to make it clear, Mr. Sullivan, all you have done is to aggregate the figures for road freight conductors, brakemen, and flagmen as killed or injured as they appear in those four lines for each of the code causes for those particular years?

A. That is correct.

The Court: We will take our noon recess at this time.

[fol. 3609] February 5, 1941, two o'clock P. M.

The witness, JOHN J. SULLIVAN, was recalled to the stand, and proceedings were resumed as follows:

Mr. Booth: Mr. Sullivan, when we adjourned this morning, Exhibit 267 had been offered for identification. I am wondering whether you had completed your description of the exhibit, passenger exhibit. I think not.

A. I don't think anything was——

Q. Are the sources of this exhibit shown in the source notes at the foot of the exhibit?

A. They are.

Q. And those sources are exclusively official statistics published by the I. C. C. in the volumes there shown in the source notes?

A. For the columns indicated, that is correct.

Q. Column B shows the number of revenue passengers carried by thousands?

A. That is correct?

Q. That is, the first figure would have three ciphers added to it to be approximately correct?

A. That is correct?

Q. And the second figure shows the number of revenue passengers carried one mile by thousands.

A. That is correct?

Q. And those figures to be correct within a thousand [fol. 3610] would have to have three ciphers added to them?

A. That is correct?

Q. Now, the train accidents and train service accidents in columns D, E, F, G, H, and I are taken from the sources shown in the footnotes?

A. Columns D and E and G and H are, and columns F and I are totals made by me.

Q. Those are additions?

A. Yes, sir.

Q. And the columns J, K and L are additions made by yourself?

A. That is correct?

Q. Columns M and N and lines 7, 14, 19, 20, 21 and 22 are computations made by you?

A. That is correct?

Q. They are merely mathematical calculations that can be checked from the face of the exhibit?

A. Yes, sir.

Q. Were the figures shown in the exhibit which were abstracted from the I. C. C. reports correctly abstracted therefrom?

A. Yes, sir.

Q. Are the computations made true and correct, to the best of your knowledge and belief?

A. They are.

[fol. 3611] Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: Your Honor, we offer the exhibit in evidence as Defendant's Exhibit No. 267.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 267.")

Mr. Booth: Now, in respect to the length of time of disability, how do the casualties shown in this exhibit where they did not result in death differ from those shown in the preceding exhibits in so far as they dealt with employees?

A. Well, as indicated in the note at the foot of the exhibit, an injury to a passenger is reportable if the injury is sufficient to incapacitate the injured person from following his

customary vocation or mode of living for a period of more than one day. In the case of employees, the injury is not reportable unless it disables the employee for more than three days within the ten days immediately following the occurrence of the accident.

Q. Under the reporting rules of the Commission, how are deaths to passengers handled in reporting the accident?

[fol. 3612] A. In the same manner as the deaths to any person. If death results within twenty-four hours after the occurrence of the accident, it is reported in the statistics as a person killed. If death results after the expiration of twenty-four hours, it is reported as a person injured and a report made of the subsequent fatality.

Q. You have shown the casualty rates by two methods, per million passengers carried and per hundred million passenger-miles. Have you any observations you desire to make as to that?

A. Yes, million passengers carried represents the absolute number regardless of the distance that the individual passengers may have travelled. In order to give an idea as to the occurrence of accidents and the exposure to injury, generally, casualties are measured against the miles travelled by the passenger which is shown in column C, and the rate is shown in column N. I would like to direct attention to the average casualty rate per passenger carried shown in column M for the four years 1935-1938, which is 4.86 per million passengers carried. That is equivalent to saying that there were less than five passengers killed and injured for every million who travelled. Related to the distance they travelled, the average casualty rate of 10.51 per one [fol. 3613] hundred million passenger-miles, it can be stated in another way, that there was only one casualty for every nine and a half million miles travelled by passengers.

[fol. 3614] Mr. Booth:

Q. The decrease rates, I take it, are self-explanatory?

A. Yes, on lines 20, 21, and 22.

Q. The bottom block contains six percentages of decrease and are not rates per number of passengers or rates per miles traveled?

A. That is correct, except one of the six items is an increase figure, in column M. There are five decreases and one increase, in column M.

The Court: Is there any particular explanation to account for that one increase in that period?

A. There are some factors. It will be noted in 1938, in column D, there was a heavier figure of fatalities in train accidents but, generally, there is not much of a fluctuation and any slight increase is very noticeable on account of the very low casualty rate.

Mr. Booth:

Q. It is only by projecting the occurrence of casualties into the million passengers carried or the hundred million passenger-miles that you get any substantial rate?

A. That is true. Any change in the absolute number affects the average casualty rate when it is related to such a large figure.

The Court: On this classification of train accidents and train-service accidents, you followed the Interstate Com-
[fol. 3615] merce Commission regulations as shown by the exhibits you have already offered on that?

A. That is true, and these figures are taken from the statistics of the Interstate Commerce Commission where they segregate these particular accidents under the group, train accidents and train-service accidents. In fact, the figures in their absolute can be checked by comparing them with Table No. 55. In other words, this is simply a summary for sixteen years of the information reported each year by the Interstate Commerce Commission in Table No. 55.

Mr. Booth:

Q. Have you prepared another of the series of national exhibits entitled, "Casualties in Highway Grade Crossing Accidents in Which Automobiles Were Involved, All Steam Railways, Reflected by Statistics of the Interstate Commerce Commission"?

A. I have.

Mr. Booth: We ask that that be marked "Exhibit No. 268" for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 268 for identification.

Mr. Booth:

Q. Does this cover the same sixteen-year period as the [fol. 3616] other exhibits?

A. It does.

Q. From what source are the figures derived in this exhibit other than the computations?

A. The source is indicated at the foot of the exhibit, column B from the Statistics of Railways, Interstate Commerce Commission; columns C, D, and E from Interstate Commerce Commission Accident Bulletins, Table No. 13, for the various years; columns F, G, and H, and the figures shown in lines 7, 14, 19, and 20, and the average comparisons in the table at the foot of the exhibit are computations by myself.

Q. For what reason do all of these national exhibits stop with the year 1938?

A. The Interstate Commerce Commission has not as yet distributed the 1939 issue, at least it hasn't been placed in my hands.

Q. Did you make arrangements to have it sent you by air mail as soon as it was issued?

A. Yes, I have an order at Washington to have it transmitted by air mail as soon as it is distributed by the Interstate Commerce Commission.

The Court: Are they customarily two years behind with that?

A. They are later this year than they have been here- [fol. 3617] tofore. They are customarily almost a year behind. Ordinarily, in previous years I have received the bulletin in November or December in the year following that for which it was prepared. In that connection I may state also if we had the accident bulletin showing the number of casualties it would hardly be possible to compute the casualty rates because the blue book, Statistics of Railways, from which I obtain all the other data usually is not distributed until about March or April and the only other source from which the figures could be obtained would be through the preliminary abstracts.

Mr. Booth:

Q. What was the purpose of preparing and offering this exhibit?

A. The occurrence of grade-crossing accidents involving the operation of trains is a very serious problem confronting the public and the railroads as can be readily seen from the columns D and E, where during this sixteen-year period over twenty-six thousand people were killed; even the four-year period from 1935 to 1938 there were 5,875 killed and when it is almost common knowledge that persons injured in automobile accidents receive very severe and serious injury the figure in column E is also quite impressive, where during the same sixteen-year period almost eighty-one [fol. 3618] thousand people were injured or a total of 107,273 were killed and injured for that period. The four latest years shown, 1935 to 1938, shows there were 23,658 persons killed and injured and by referring to column G where the casualty rate has been calculated on a train-mile basis it will be noted that the rate is somewhat constant.

Mr. Strouss: I don't think this exhibit has been admitted, has it?

The Court: No, I think not.

Mr. Booth: Have you any questions on this? I beg your pardon.

Mr. Strouss: No, I have no questions.

Mr. Booth: Any questions, your Honor?

The Court: No.

Mr. Booth: We offer the exhibit in evidence.

Mr. Strouss: I have no objection.

The Court: It may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 268.")

Mr. Booth: I would like to have the witness' explanation stand if there is no objection.

Mr. Strouss: All right.

Mr. Booth:

Q. You spoke of the rate being somewhat constant in column G?

A. Yes, I invited attention to the fact by examining the [fol. 3619] figures in column G that the casualty rate on a train-mile basis shows it has remained somewhat constant. There are slight fluctuations and those fluctuations can more readily be observed by examining the block at the foot of the exhibit in the same column in comparison of average

casualty rates, which shows there is a direct relationship to the operation of trains.

The Court: Taking the year 1938, Mr. Sullivan, it would indicate by reference to the previous exhibit, No. 267, there was considerably less than half the casualties to passengers on trains as what there were casualties to occupants of automobiles at grade crossings during that year?

A. That is correct, the figure in No. 268 shows 5,090 whereas the figure on exhibit No. 267 is 2,335.

The Court: I am wondering why you limited your statistics here in exhibit No. 268 to automobile accidents in grade crossings rather than including all accidents at grade crossings whether it happened to be a pedestrian or a vehicle pulled by horses?

A. Your Honor, this was simply an abstract from a similar table that is prepared by the Interstate Commerce Commission and it is possible from the same table to show [fol. 3620] all casualties regardless of whether they are occupants of automobiles or other vehicles, except that all of the other types is not a very impressive figure. I will say 90 per cent or more accidents occurring at grade crossings involve the occupants of motor vehicles.

The Court: The other is negligible?

A. That is true.

Mr. Booth:

Q. Is it true that you can relate these figures to the number of automobile registrations and there is no way of relating the figures to pedestrians or horse-drawn vehicles?

A. You couldn't relate the casualties to the automobile registrations but they could be related to the million train-miles and possibly I could prepare an exhibit showing that particular study. It would not affect the casualty rate on a train-mile basis very much, but it would increase it because there would be some additional persons included in the total casualties.

Q. Will you refer to the table by number which you just described in your answer to the Court?

A. Table No. 13 in the accident bulletin.

Q. Will you state whether the Interstate Commerce Commission has commented on this subject of its statistics relating to grade crossing accidents in the same bulletin in [fol. 3621] the table was published?

A. Yes, it regularly comments and make observations of the figures reflected by their statistics in the bulletin for the year 1938, Accident Bulletin No. 107, page 11, in the first column.

Q. Will you read that, please?

A. (Reading) "The percentage of reduction in grade-crossing fatalities in 1938 corresponds with that in motor vehicle experience generally. There was a reduction of 19.09 percent in highway grade-crossing fatalities and an estimated reduction of 19.28 percent in motor vehicle deaths.

"Accidents at rail-highway crossings involving motor vehicles were responsible for 4.10 percent of all motor vehicle deaths in 1938.

"There was a decrease in 1938 compared with 1937 of 27.67 percent in the cases where the motor vehicle ran into the side of the train and a reduction of 20.52 percent in the number of cases where the motor vehicle was struck by the train.

"In collision of motor busses and trains, 12 accidents caused 34 fatalities and 73 injuries. School busses were involved in 4 of these accidents which resulted in 28 deaths and 26 injuries.

"In 1938, 53.06 percent of the motor vehicle accidents at [fol. 3622] grade crossings occurred during daylight. The hour of greatest frequency was between 5 and 6 p. m., though it was but slightly higher than in the other hours between 3 and 7 p. m. In a segregation of night accidents according to hour of occurrence, the hour of greatest frequency was between 11 p. m. and 12 midnight. Saturday was the day of greatest frequency. Winter is the season of highest accident frequency at grade crossings. In 1938, 35.58 percent of the total number occurred in November, December, and January, with a peak in December.

"In proportion to the total number of crossing accidents in 1938, the number in which motor trucks were involved declined somewhat under 1937 while those in which passenger automobiles were involved increased slightly in 1938.

"More freight trains were involved in collisions with motor vehicles in 1938 than passenger trains. Freight trains were involved in 45.19 percent, passenger trains in 43.19 percent, and switch and work trains in the remainder. The frequency rate per million locomotive- and motor train-

miles in 1938 was 2.73 for freight trains and 3.24 for passenger trains.

"Out of a total of 1,450 night accidents, 352 or 24.28 per-
[fol. 3623] cent occurred at crossings at which flood, street or other lights had been especially installed to illuminate the crossing.

"Forty-eight percent of all accidents involving motor vehicles occurred at city crossings and 50 percent at rural crossings. Crossings in communities with a population exceeding 2,500 were classed as city crossings.

"Sixty percent of the accidents involving freight trains and motor vehicles occurred at train speeds of less than 20 miles per hour. In 10 percent of the cases, the train was standing. Approximately 34 percent of the accidents involving passenger trains occurred at train speeds ranging from 10 to 29 miles per hour. Seventy-five percent of the accidents involving switching movements occurred at speeds under 10 miles per hour. In 13 percent of these, the train was not in motion."

Q. There is another quotation, I believe, on page 10 of the same bulletin in which the Commission further analyzes these statistics?

A. In the first column at page 10 under the caption, "Highway Grade-Crossing Accidents," it reads:

"Total accidents at public highway grade crossings in
[fol. 3624] 1938 constituted 33.7 percent of the fatalities in all railway accidents and 14.7 percent of all nonfatal injuries. In accidents involving train operation, they accounted for 35.4 percent of all the fatalities and 25.9 percent of the injuries reported by carriers.

"In 1938, 1,517 persons were killed and 4,018 injured in accidents at highway grade crossings. This was a reduction of 358 fatalities and 1,118 injuries under 1937. Automobiles were involved in 88 percent of the accidents at grade crossings in 1938. As may be noted in table 50, 1,198 out of a total of 3,437 accidents that caused casualties at highway grade crossings in 1938 occurred at crossings protected by gates, watchmen, or the various types of signals which indicate the approach of a train. Two thousand, two hundred and thirty-nine accidents occurred at crossings not having the protection described above. Added significance would be given these figures if a record of the proportion of the traffic using these crossings were available.

"As in the case of railway accidents in general, there is a close relation between the number of grade-crossing accidents and volume of traffic. This relation may be noted in [fol. 3625] the table which follows, wherein train-miles are used to express volume of rail traffic, and automobile registration and gasoline consumption to indicate the highway hazard. Although it is recognized that the number of automobiles which pass over railway crossings is not necessarily in proportion to the number registered, it is the best available measure in the absence of an actual count of the number of automobiles that cross railways in a year. As may be observed from table 13, the accident rate whether based on train-miles, automobile registrations, or gasoline consumption is less in 1938 than in the preceding year and in most instances below that shown in the other years covered in the table."

[fol. 3626] Mr. Booth: Just in that connection 1938 was the lowest year; the total number of train-miles as shown by this exhibit, of the four years in the last block, is it not?

A. Yes, it is the lowest since 1933.

Q. Mr. Sullivan, have you prepared another national exhibit in three sheets headed "Train Accidents and Resultant Casualties, All Railroads of the United States, Reflected by Statistics of the Interstate Commerce Commission, Years 1923 to 1938, Inclusive?"

A. I have.

Mr. Booth: We ask that that be marked Exhibit 269 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 269 for identification.

Mr. Booth: Are the sources from which this exhibit was prepared, are all the sources from which this exhibit was prepared shown in the source note on the first page of the exhibit?

A. They are.

Q. Those are the same statistics of railways and the same accident bulletins to which you have been referring?

A. That is correct.

[fol. 3627] Q. You have already defined the meaning of the word "train accidents" within the meaning of the reporting rules of the Commission?

A. Yes, sir.

Q. Into how many classes are those train accidents grouped?

A. Five general classes.

Q. Five general classes, by the Commission itself?

A. Yes, sir.

Q. What are those general classes?

A. Collisions, derailments, locomotive boiler accidents, other locomotive accidents, and miscellaneous train accidents.

Q. Now, what does sheet 1 of the exhibit show in columns, taking up all the columns, what does the first column B show?

A. Column B shows the total car-miles in thousands. Column C shows the total train-miles in thousands.

The Court: This covers both freight and passenger operations?

A. All classes of service, yes, sir.

Mr. Booth: And all railroads in the United States as distinct from all Class 1 railroads?

A. That is right. And column D includes the total lo-
[fol. 3628] comotive-miles in thousands, columns E, F, G, H, and I show the absolute number of each of the different types of accidents as shown by the statistics of the Commission for each of the years 1923 to 1938, the lines 7, 14, and 19 being additions and calculations by myself, as is column J, showing the total of all of the types of train accidents. The statistics not only show the total number of train accidents, but it also shows the number of such train accidents in which casualties occur, and that information is shown in column K of the exhibit, and as to those train accidents in which casualties occur, I have shown in columns L, M and N the casualties to train and engine-men on duty in such accidents.

Q. Those again, with the exception of the additions, are exact copies of the figures in the I. C. C. bulletins from which they were taken?

A. That is correct.

Q. You didn't have enough room on page 1, I take it, to complete this. And what is the explanation as to page 2?

A. Collisions are further subdivided on pages 14 to 16, inclusive, of the rules into nine separate subdivisions, or classes, and the most important of this and the group in

which most of the accidents occur are the rear-end and [fol. 3629] head-on collisions, and these figures representing that particular type of collisions are shown in column B, which is the number of rear-end, and column C the number of head-on, D being simply an addition of the two, and are shown on sheet 2 of this exhibit. Likewise, in columns E and F, the casualties of trainmen and enginemen on duty in rear-end and head-on collisions are shown in their absolute number.

Q. Those figures again are copies of the entries of the I. C. C. reports?

A. That is true as indicated in the source reference at the foot of the exhibit.

Q. Did you complete page 2?

A. Train accidents, as I have stated before, are further separated into groups, which, as to defects or failures of equipment generally involve derailments. The Interstate Commerce Commission in classifying accidents as to defects and or failures of equipment have a number of predetermined groups, one being locomotives and tenders, defects or failures in trucks, defects and failures of wheels and axles, defects and failures in power brakes, which includes the airbrake apparatus, defects and failures of hand-[fol. 3630] brakes, of couplers, of draft rigging, and car bodies, and other parts of the cars, and the figures shown by the Interstate Commerce Commission in their accident bulletins for these various groups have been transferred to this exhibit and shown in columns H to O inclusive, on sheet 2 under the caption "Train Accidents Due to Defects in or Failures of Equipment." In columns Q and R, the figures shown by the Interstate Commerce Commission bulletins cover trainmen and enginemen on duty injured in these accidents has been shown. Column P for the total number of accidents and column S for the total number of casualties are additions by me.

Q. And those are two columns which are related in that exhibit; in other words, the total number of casualties to trainmen and enginemen on duty in the last block on the right applies to column P, does it?

A. Column P. It will be noted that both the number representing the number of accidents and the number representing the casualties appear under the caption headed

"Train Accidents Due to Defects in or Failures of Equipment."

Q. Now, take sheet 3.

A. Sheet 3 is simply the calculations of casualty rates, [fol. 3631] all of which were computations by myself, using the basic figures in columns B, C and D on page 1 of the exhibit, and the other columns as to the absolute number of accidents and the absolute number of casualties shown under the various captions on pages 1 and 2 of the exhibit.

Q. Is this exhibit true and correct, to the best of your knowledge and belief?

A. It is.

Q. It represents your personal work, does it?

A. It does.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Booth: We offer the exhibit in evidence.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 269.")

The Court: Now, Mr. Sullivan, if I understand it, if there was a mere failure of the locomotive or failure of any of the equipment that did not cause an accident, why, then those failures would not be reflected in any way in the statistics shown in this exhibit?

A. If the failure, regardless of its character, caused damage to the equipment or railway property exceeding $150, [fol. 3632] it would be reported as an accident.

Q. Under that, it would not?

A. It would not.

Mr. Booth: Are the percentages of improvement, or decrease, as you term it, shown on this exhibit, and if so, where?

A. It is shown on sheet 3 on items 20, 21, and 22, and according to the index at the extreme bottom of the exhibit. In other words, as was true of other exhibits which have been introduced in this case, they are all decreases, the decrease in the average accident or casualty rate for the indicated group of years is compared with another, and the percentage of decrease of such casualty rates is shown on the appropriate line.

Q. Now, on the first page you show in column J total number of train accidents in these five general groups, in column K you show the total number of those accidents which resulted in casualties. Do you desire to make any observation regarding that?

A. Yes. An impression might prevail that every train accident causes an injury to someone. By comparing the figures shown in column K with the figures shown in column J, it will be observed that only a small percentage of the train accidents that occur result in personal injury.

[fol. 3633] Q. That would be an even smaller percentage than accidents to trainmen and enginemen?

A. Well, somewhat smaller, yes, because this showing includes injuries to all persons, and there have been any number of the 2,084, for instance, shown at the foot of the page, which did not result in injury to trainmen or enginemen on duty.

Q. Well, injuries to trespassers caused by an accident which resulted in damage of more than $150 to equipment, would be in this group?

A. In this particular showing, it would be.

Q. Is there any indication in the report of the Commission, say of 1938, as to what proportion of the total number of injuries were injuries to trespassers and what to trainmen?

A. Well, it cannot be determined from this exhibit, but you can determine the number of accidents to all classes of persons by examining the statistics.

Q. This includes freight trains, passenger trains, work trains, and mixed trains, does it?

A. And yard accidents. It includes all train accidents in all of the groups that are reportable under the rules of the Commission.

[fol. 3634] Mr. Booth: I will pass to another exhibit if there are no questions. Have you prepared an exhibit consisting of 26 sheets entitled "Tabulation of Data Shown in Summaries of Accident Investigation Reports, Interstate Commerce Commission, Bureau of Safety, In So Far as It Relates to Accidents Involving Road Freight Trains, Including Mixed Trains Handling Freight Cars, Years 1928 to 1939?"

A. I have.

Q. Have you with you and available to counsel the quarterly reports of the Interstate Commerce Commission containing the investigations made by the Bureau of Safety of Accidents on the railroads of the United States?

A. I have.

Mr. Booth: I would like to ask to have this marked as Exhibit 270.

The Court: It may be so marked.

The Clerk: Defendant's Exhibit No. 270 for identification.

Mr. Booth: Now, calling your attention to sheet 3 of this exhibit, does that sheet contain a copy of the Act of Congress under which the reports of accidents are required by the Commission and under which it investigates accidents.

[fol. 3635] A. Yes, sir, it is quoted in full in the first two columns on page 3 of the exhibit.

Q. I take it that the underlining there is your work for emphasis, and does not represent an italicised or otherwise conspicuous part of the Act of printing?

A. That is correct, that underlining is my own.

Q. These quarterly reports, a sample of which has already been exhibited and the rest of which you have here, are those the reports made of investigations conducted under section 3 of the Act as shown on page 3 of this proposed exhibit?

A. They are.

Q. Have you personally examined each of those quarterly reports, and each page thereof, for the years 1928 to 1938, inclusive, as the basis for the information abstracted on this report?

A. I have.

Q. And is the information shown on this report exclusively taken from those quarterly reports?

A. It is, as far as the narrative and the information is concerned.

Q. Now, turning to page four of the proposed exhibit, is that typical of the other pages that follow?

[fol. 3636] A. It is.

Q. Column 1 contains a number of four-digit numbers. What do they represent?

A. It is shown for reference, and it represents the investigation number assigned by the Interstate Commerce

Commission Bureau of Safety to their report of the investigation of the specific accident.

The Court: It is merely their docket number?

A. That is right. Each accident investigated is numbered consecutively by the Interstate Commerce Commission Bureau of Safety.

Mr. Booth: And Columns 3 and 4 show what?

A. Shows the persons killed and the persons injured in the accident, as reported by the investigation report.

Q. What does the expression "Number of accidents" mean at the head of Column 2?

A. Simply means that one accident is investigated and it was placed there merely for convenience of tabulating; it could have been omitted.

Q. Do these bulletins show in each case the lengths of the various trains, freight trains involved in the accidents?

A. In every case it shows the full identification of trains; [fol. 3637] and the number of cars that the trains consisted of.

Q. And were you able, from that source and that source alone, to prepare the information contained in columns 5 to 13 inclusive?

A. Yes, sir.

Q. Columns 14 to 17, inclusive, are merely a mathematical calculation from what precedes?

A. That is correct.

Q. Now, taking up the first section of the page, which I will have to identify a little more specifically, it is headed "I"—Roman numeral I, "Negligence of Employes," and following that you have thirty-five descriptions; on this one page you have thirty-five descriptions. Are those descriptions your version of the report of the Commission, or are they taken bodily from the findings of the Commission as to the cause of the accidents?

A. That is the literal language used in the report of the Bureau of Safety in assigning the cause of the accident. No part of the language used by the Commission has been altered by me in any way, and I may state that as to listing these train accidents under the various causes, for instance, Item I, "Negligence of Employes, (A) Train Orders," this conforms to the classification and subdivi- [fol. 3638] sions used by the Interstate Commerce Commission themselves, as shown in the rules, covering the monthly

reports of railway accidents under train accidents, pages 38 to 46, inclusive.

Q. Of the rules governing accidents, which are part of exhibit 9?

A. Yes, sir.

Q. Now, going back to pages 1 and 2 of the proposed exhibit, what are those pages?

A. Pages 1 to 4, tabulations and calculations made by me, based on the information which is summarized following supporting sheets under the various heads. Each accident bulletin indicates the date for which it was rendered, there is an index that shows the number of accidents investigated, the text of the various accident investigation reports indicate the kind of train involved and the character of accident, the persons killed and injured, the length of the train and the cause assigned, and from that information in the bulletin the various blocks, four items to a block for each year, has been transcribed on sheets 1 and 2 for the years 1928 to 1939, inclusive.

Q. Sheet 2, the bottom block of sheet 2, and headed "Causes of Accidents," and so forth, is what?

[fol. 3639] A. Sheet 2 is the summary showing the number of accidents under the general subdivisions used by the Interstate Commerce Commission, negligence of employes, defects in or failures of equipment, defects in or improper maintenance of way structures, and miscellaneous causes, and for those items, in columns 1 to 17 in the lower block has been shown a summary for the entire study covered by the exhibit.

Q. That can be checked mathematically with the succeeding pages?

A. It can.

Q. You took all accidents for the years covered by this exhibit in which a road freight train was involved, including mixed trains handling freight cars?

A. That is correct.

Q. Didn't leave any out?

A. I did not.

Q. And you didn't select any particular type or types of accidents?

A. I did not.

Q. Was there any element of your own personal judgment or opinion involved in arriving at the information shown here as to cause of the accident?

A. None at all. The only part in the preparation where [fol. 3640] my judgment was used was the manner in which it should be reflected.

Q. The mechanical arrangement?

A. The mechanical arrangement of the information.

Q. Can this statement and each and every item on the study of the proposed exhibit 270 be checked with the underlying reports which you have here in the court room?

A. It can.

Q. Are you satisfied that it is true and correct?

A. Yes, sir.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No questions.

The Court: Well, Mr. Sullivan, referring to page 2 there, in column 3, that says that the grand total number of all accidents, of accidents of all kinds of trains investigated was 1002. That doesn't necessarily mean that there weren't more than 1002 accidents, but it merely means that 1002 is the number of accidents that the Interstate Commerce Commission investigated.

A. That is true. I know by comparing this figure with the figures shown in the other statistical reports that there [fol. 3641] were other train accidents that the Interstate Commerce Commission Bureau of Safety did not investigate. This simply represents the number that were investigated by the Commission.

Mr. Booth: Will you state to the Court whether during the period covered by this exhibit there was any form of telegraphic report required by the Commission of certain classes of accidents preceding and independent of the submission of the Form T or any other form?

A. Yes, by reference to sheet 3 of the exhibit, at the extreme right or in the third column is copied a copy of the order of the Interstate Commerce Commission issued on December 8, 1928, which requires that carriers report by telegram "any collision or derailment upon the railroad operated by such common carrier resulting in the death or serious injury of one or more persons, including any collision with a motor vehicle at a grade crossing resulting in the death or serious injury of any passenger, employee or other person riding on the train involved in such collision." Invariably the Bureau of Safety investigates any train accident wherein death results to a passenger, and

in many cases where there is serious injury, and they investigate a majority of the train accidents involving [fol. 3642] freight trains where death to persons results, and in some cases where death does not result.

The Court: Well, then it is the major accidents that are investigated, and the minor ones that are not investigated?

A. That is it, the more important accidents with the serious results or questionable cause are investigated by the Interstate Commerce Commission through the medium of their own inspectors.

Mr. Strouss: Mr. Sullivan, I notice at the bottom of page 2, you show the total number of trains, classifying them as to trains of seventy cars and less and trains of over seventy cars, showing then the percentage that were over seventy cars and those under. Now, that percentage, I take it, is the percentage of the accidents?

A. No, the percentage of the number of trains.

Q. Trains in the accidents investigated?

A. Yes, because in one accident there may be two freight trains involved, for instance, a collision.

Q. I mean the trains, that is, the percentage of the number of trains in the accidents investigated?

A. As to lengths, that is correct.

[fol. 3643] Q. Of course, it doesn't in any way show, nor do any records of the I. C. C. show, the related number of short and long trains operated during that period?

A. No, there is no information of that kind available.

Mr. Strouss: That is all.

Mr. Booth: We offer the exhibit in evidence.

Mr. Strouss: I don't see its materiality, but I am not going to object to it.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 270.")

Mr. Booth: We tender the underlying documents to you for your examination at your convenience.

Mr. Strouss: Yes, I would like to have them.

Mr. Booth: Is there in any of the investigation reports upon which this exhibit was founded any statement or indication in any manner that the length of the train was responsible for any of the accidents investigated?

Mr. Strouss: I object to that.

Mr. Booth: That is the only way I know to prove a negative.

The Court: I will overrule the objection; he may answer Yes or No.

[fol. 3644] A. I have examined and read every report for the period covered by the exhibit, and in no case did the Interstate Commerce Commission state that the accident could have been or might have been avoided, or that the length of the train in any way was involved.

Mr. Booth: May we take our recess now, your Honor?

The Court: Yes, we will take our recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows:)

[fol. 3645] Mr. Booth:

Q. Mr. Sullivan, just before recess I asked you the following question which was objected to and the objection overruled: Is there in any of the investigation reports upon which this exhibit was founded any statement or indication in any manner that the length of the train was responsible for any of the accidents investigated? And your answer was, "I have examined and read every report for the period covered by the exhibit, and in no case did the Interstate Commerce Commission state that the accident could have been or might have been avoided or that the length of the train in any way was involved."

A. That it might have been avoided if the train had consisted of a lesser number of cars, or any reference that the length of train had anything to do with the accident.

Q. In connection with this exhibit No. 270, taking the block at the bottom of page No. 2, of the freight trains involved in the investigation as covered by this exhibit, how many were 70 cars or less?

A. 574 or 78.8 per cent.

Q. How many over 70 cars?

A. 154 or 21.2 per cent. Of course, you understand that is for the full twelve-year period.

[fol. 3646] Q. Of the total number, how many trains were 40 cars or less?

A. 344 or 47 per cent.

Q. What percentage of these accidents was found by the Commission to have resulted from the negligence of employees?

A. 62.2 per cent.

Q. And from defects in or failures of equipment?

A. 14.1 per cent.

Q. And from defects in or improper maintenance of way and structures?

A. 5.9 per cent.

Q. From miscellaneous causes?

A. 17.8 per cent.

Q. Can those causes be further broken down progressively by years for the use of anything in this exhibit, and, if so, what?

A. Each period covered by the exhibit shown on sheet No. 1 and No. 2, a similar breakdown to the table at the bottom can be made as to the cause of the accident and the proportion of the various train lengths involved.

Q. That is a matter of analysis that I don't think I want to burden the record with at this time. Have you prepared another exhibit similar to the one just admitted as exhibit [fol. 3647] No. 270 and relating to passenger trains for the years 1934 to 1939, inclusive?

A. I have.

Mr. Booth: I hand the reporter an exhibit consisting of thirteen sheets and will ask that the exhibit be marked No. 271 for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 271 for identification.

Mr. Booth:

Q. Was this exhibit prepared exclusively from the same quarterly reports used in the preparation of exhibit No. 270?

A. It was.

Q. But the period is a lesser period?

A. Yes, sir.

Q. How long did it take you, working time, to prepare this exhibit?

A. About twenty working days. I had already reviewed the reports in the preparation of the other exhibits and

had marked the investigation report references that involved only passenger trains.

Q. To what is this proposed exhibit No. 271 confined?

A. It is confined to all accidents investigated by the [fol. 3648] Bureau of Safety in which passenger trains were involved.

Q. Whether it was one passenger train or two passenger trains?

A. Or a passenger train and a freight train, any accident where the operation of the passenger train was involved in the accident.

Q. And this like the other, No. 270, covers all railroads in the United States or only Class I railroads?

A. It covers any accident investigated by the Bureau of Safety and they have jurisdiction over all railroads.

Q. Are the statements "Causes of Accidents" subject to the same explanation exactly as the explanation you gave of those statements in exhibit No. 270?

A. Exactly the same.

Q. No element of personal judgment or choice of words on your part?

A. No, sir.

Q. Nothing was resorted to in the preparation of this exhibit except the quarterly reports for the years 1934 to 1939, inclusive?

A. That is correct. There is some difference in the summary of causes of accidents investigated between the [fol. 3649] exhibit No. 271 for identification and exhibit No. 270 in that I have made a segregation of the accidents classified as "Collisions with Vehicles at Grade Crossings" on account of there being such a large percentage involved and that is an additional cause that has been separated from the miscellaneous.

Q. In exhibit No. 270 that was embraced in the miscellaneous causes?

A. Yes, because there was not a very large number of freight train accidents involving automobiles or grade crossing accidents investigated by the Commission.

Q. Are the computations made in this exhibit true and correct?

A. Yes, sir.

Q. And the result of your own personal work?

A. Yes, sir.

Q. Is the exhibit itself true and correct to the best of your belief?

A. It is.

Q. And the same accident bulletins for the years 1934 to 1939, inclusive, that in part underlie exhibit No. 270 underlie this?

A. Not the accident bulletins but the quarterly summaries.

[fol. 3650] Mr. Booth: I mean the quarterly summaries. Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: Your Honor?

The Court: No.

Mr. Booth: We offer this in evidence as defendant's exhibit No. 271.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 271.")

Mr. Booth:

Q. How many occurrences were investigated which went into this table?

A. Involving passenger trains, a total of 232 accidents out of a total of 520 of all accidents investigated.

Q. What percentage of those did you find due to negligence of employees?

A. 48.3 per cent, that is, negligence of employees as described by the Interstate Commerce Commission, Bureau of Safety.

Q. What were found by the Bureau of Safety to be due to defects in or failure of equipment?

A. 3 per cent.

Q. To defects in or improper maintenance of way?

[fol. 3651] A. 9.1 per cent.

Q. To collisions with vehicles at grade crossings.

A. 18.1 per cent.

Q. And to miscellaneous?

A. 21.5 per cent.

Q. Was the length of the passenger train, or the trains if there was more than one, stated in each case in the report which formed the basis of this tabulation?

A. Yes, it was.

Q. You have tabulated here the number of trains of 14 cars or less and their percentage and the number over 14 cars and their percentage. Will you give those figures, please?

A. Of the total number of trains involved, which was 267, of the 232 accidents investigated for the six years, 261 trains consisted of 14 cars and less or 97.8 per cent and 6 trains consisted of over 14 cars or 2.2 per cent.

Q. Are the details of the accidents involving those six trains shown in the first sheet?

A. Yes, I have briefly narrated the character of the accidents for the six trains consisting of more than 14 cars, but the detail of the cause and the other data as given [fol. 3652] by the Interstate Commerce Commission may be found on the appropriate page opposite the Interstate Commerce Commission investigation number that I have shown opposite the item on sheet No. 1.

Q. These six statements under the heading, "Brief Description," on page No. 1 are simply literal transcripts of what appeared by the same investigation number in the following pages, is that correct?

A. Yes, except more information is included in a sentence, where on the following pages it is tabulated.

Mr. Strouss: May I ask a question. An accident investigated by the Commission which involved a freight train fouling on passenger tracks derailing a passenger train, would that be included in this?

A. Yes, it would, if the passenger train was derailed, it would be in there.

Mr. Strouss: Under what heading would that appear?

A. It would depend upon the cause. If it was employee negligence, it would likely be on page 4, "Failure to identify opposing trains or to clear superior trains," or it might be under item 5, "Overrunning scheduled meeting point or [fol. 3653] failure to clear switch at meeting or passing points." It would depend upon the cause assigned by the Bureau of Safety of the Interstate Commerce Commission as to where it might be shown.

Mr. Strouss: Thank you.

Mr. Booth:

Q. Is there any accident that occurred in Arizona shown on this exhibit?

A. Yes.

Q. Where?

A. On sheet No. 11, item 30, opposite investigation 2371, was an Arizona accident.

Q. Has the Commission during this period investigated any other accidents to passenger trains and placed the results of its investigations in its quarterly bulletins than those shown in this exhibit? In other words, have you included in the exhibit all passenger trains investigated by the Bureau of Safety during the period covered by the exhibit?

A. They are all included for the years 1934 to 1939, inclusive.

The Court: Was this Arizona accident shown on sheet No. 11 on the Southern Pacific lines or on the Santa Fe?

A. It was on the Santa Fe.

Mr. Booth:

Q. There were 232 occurrences investigated or what you [fol. 3654] call "accidents," were there?

A. Involving passenger trains, that is correct.

Q. And those involved a larger number of passenger trains than 232, did they not? In other words, in some of those occurrences there was more than one passenger train?

A. Of the 232 occurrences, it involved a total of 261 passenger trains.

Q. In any of these investigations, did the Interstate Commerce Commission state or in any way intimate or did the Bureau of Safety of the Interstate Commerce Commission intimate in any way that the length of the passenger train in any way contributed to the accident?

Mr. Strouss: Again I make my objection, that is irrelevant and incompetent.

The Court: Objection overruled.

A. No.

Mr. Booth:

Q. Have you, independent of this exhibit, in the courtroom with you investigation report No. 1718 of the Interstate Commerce Commission related to the derailment of passenger train at Dome, Arizona, on August 5, 1931? Do you have that report with you?

A. Yes, that is in quarterly report No. 49 for the period [fol. 3655] July to September, 1931.

Q. Referring solely to that report, what were the circumstances of that accident as found by the Bureau of Safety?

Mr. Strouss: If he is asking the witness to give his conclusions, I object to that.

Mr. Booth: This was an extra train of about three cars. We have the train sheets here and the train sheets will show that the Arizona law made it necessary to run this train. It was run on ahead and was a very light train, and if was wrecked and the men were killed directly chargeable to the law is our contention.

Mr. Strouss: If they want to put the whole report in, that is all right.

The Court: You mean the particular docket number 2371?

Mr. Booth: We will have the report copied and put that in. I will defer this until then.

Mr. Mason: I think the record should be clear here; we were not talking about the Coconino accident on the Santa Fe, that is 2371. We were talking about an accident which is not on exhibit No. 271. It occurred prior to the period studied by that exhibit.

Mr. Strouss: It occurred in 1931, didn't I understand [fol. 3656] you to say?

The Court: There were two accidents, Mr. Strouss, the Santa Fe accident and the accident occurring in 1931. The one Mr. Booth was interrogating about occurred in August, 1931, on the Southern Pacific.

Mr. Booth: The one I referred to is investigation report 1718, an accident occurring on August 5, 1931, which is not shown on this exhibit at all and which occurred on the Southern Pacific near Dome, Arizona.

Mr. Mason: The Coconino accident is referred to particularly on sheet No. 13 of exhibit No. 271 as having occurred on the Santa Fe on July 27, 1939.

Mr. Booth:

Q. Have you prepared an exhibit headed, "Casualties to All Classes of Employes on Duty, All Classes of Service, Sustained in Train and Train Service Accidents, Reflected by Statistics of the Interstate Commerce Commission,

Years 1923-1938, Inclusive," for the Southern Pacific Company (Pacific Lines)?

A. I have.

Mr. Booth: We ask that that be marked "Exhibit No. 272" for identification.

The Court: It may be marked.

[fol. 3657] The Clerk: Defendant's exhibit No. 272 for identification.

Mr. Booth:

Q. From what source or sources was this exhibit prepared?

A. From the Interstate Commerce Commission Annual Accident Bulletins.

The Court: Do I understand you have completed your showing on the national picture and are starting now on the accident reports of the Southern Pacific Company?

Mr. Booth: I think we have unless there is some exhibit that hasn't reached here yet. Is that correct, Mr. Sullivan, are there any other national exhibits?

A. I think it is complete.

Mr. Booth:

Q. What does column B show on this exhibit No. 272 for identification?

A. It shows the total locomotive-miles in thousands as shown in the annual accident bulletins of the Interstate Commerce Commission.

Q. And columns C and D?

A. The killed and injured as shown in the accident bulletins for each of the years.

Q. And columns E and F are merely mathematical calculations from the preceding columns, are they?

A. That is correct.

[fol. 3658] Q. Lines 7, 14, 19, 20, 21 and 22 are your computations, are they?

A. They are.

Q. And the three bottom lines, 20, 21, and 22, show the decreases as described in those lines?

A. Except one item; 21 is an increase.

Q. Yes, I overlooked that. There was an increase in the period from 1935 to 1938 as compared with the period from 1929 to 1934?

A. That is correct, an increase of about one casualty or a little less.

The Court: This exhibit No. 272, Mr. Sullivan, is comparable to exhibit No. 262 showing the national picture?

A. It is.

Mr. Booth:

Q. Is there anything in the figures on the face of the exhibit that might be pointed to as accounting for a portion, at least, of the increase just referred to?

A. Yes.

Q. What is it?

A. The higher casualty rate of 9.67 in the year 1937 accompanied a very heavy increase in business compared with the two preceding years of the same block and it was the heaviest business reflected by locomotive-miles since 1929. [fol. 3659] Heavy increases in business have a tendency to increase the number of casualties in a more rapid rate than the business increase.

Q. Because of the greater number of men employed?

A. The greater number of men and an increased number of new men taken into the service, and with an increase in locomotive-miles or business there is always an increase in yard and terminal switching service out of proportion to the increase in traffic.

Mr. Booth: Any questions on this exhibit, Mr. Strouss?

Mr. Strouss: No questions.

The Court: Mr. Sullivan, I notice on exhibit No. 262 that you computed your casualty rates on car-miles, train-miles, locomotive-miles, and man-hours, whereas on this exhibit the computation apparently is on locomotive-miles?

A. It could have been calculated on the other basis, but as I explained before when you take all classes of employees on duty, it includes classes of service where train-miles or car-miles are not involved, they are not accumulated, and I believe I explained my reason on exhibit No. 262 for showing all of the various bases, not that they were appropriate [fol. 3660] in all cases but to give as complete a picture of the national showing as could be reflected. Now, the train-miles and car-miles and man-hours can be calculated for exhibit No. 272, but as to individual railroads in the Interstate Commerce Commission statistics they do not make all

of the various segregations as they do for the railroads as a whole; so we are limited in our ability to draw off statistics by classes where we only use the accident bulletins themselves.

The Court: Do I understand that the Interstate Commerce Commission uses the locomotive-miles as their unit of computing these?

A. Locomotive-miles and man-hours, those two, but they make frequent reference to train-miles and other statistics in comparisons.

Mr. Booth:

Q. That is where they are considering all employees?

A. That is true.

Q. Train service and non-train service?

A. I may explain the reason for not using the man-hours or the other bases of measurement for a system showing. There are so many varied factors entering into it that rather discolor the comparisons. Various states have different full crew laws. A considerable mileage of the South-[fol. 3661] ern Pacific is in California and all of the casualty comparisons, either one state with another or even a system showing is distorted by the provisions of the California law.

Mr. Booth: We offer this exhibit in evidence as defendant's exhibit No. 272.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 272.")

[fol. 3662] Mr. Booth: Have you prepared an exhibit showing casualties to trainmen on duty, all classes of service, sustained in train and train-service accidents reflected by statistics of the Interstate Commerce Commission, years 1923 to 1938, inclusive, Southern Pacific Company, Pacific Lines?

A. I have.

Mr. Booth: We ask that that be marked No. 273 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 273 for identification.

Mr. Booth: Is this a companion to the preceding exhibit, No. 272?

A. Yes, with a limitation to certain class of employees.

Q. Is that limitation shown in the footnotes to the exhibit?

A. It is.

Q. And is the definition of trainmen as used in this exhibit shown in the first footnote on the face of the exhibit?

A. It is.

The Court: Does the word "trainmen" as used here, include the engineer as well?

A. It does, engineers and firemen.

[fol. 3663] Q. Is this exhibit comparable to No. 263?

A. It is.

Mr. Booth: Now, in this exhibit you have used in addition to locomotive-miles, man-hours and car-miles?

A. That is correct.

Q. Although this is a companion to Exhibit 272. Why did you use the three bases in this exhibit and only one in the other?

A. As I explained before, the other exhibit includes all classes of employees, as I explained in connection with the national exhibit, includes employees who have no connection whatever with the operation of the train, but who are subjected to the hazard of injury of the trains, for instance, car inspectors and car repairers who may be working in the train yard, the yard clerk, car checkers, maintenance of way department, B and B department, and signal department, who work on the track and structures and who are subject to injury through the operations of locomotives and trains, and in this exhibit 273 for identification, I have shown the locomotive-miles and the man-hours worked and the car-miles, so that it will present a picture both from the standpoint of exposure to injury measured by locomotive-miles [fol. 3664] and man-hours and the relation of the occurrence of casualties to the movement of a given amount of traffic measured on a car-mile basis.

Q. This includes among the term "trainmen" passenger trainmen as well as freight yard or work service trainmen?

A. That is correct.

Q. These are the employees included in these exhibits whose services accumulate car-miles in this exhibit?

A. And locomotive-miles also, it includes a class of employees, yard trainmen or yardmen and yard enginemen,

a service which does not accumulate train-miles or car-miles. That is the reason I have included the column in this exhibit "locomotive-miles".

Q. And also the reason you put in man-hours?

A. That is correct.

Q. The sources of this exhibit are fully stated on the face of it?

A. Yes, sir.

Q. You made the computations yourself?

A. I have.

Q. And is the exhibit true and correct to the best of your knowledge and belief?

A. It is.

Mr. Booth: Any questions, Mr. Strouss?

[fol. 3665] Mr. Strouss: No questions.

Mr. Booth: We offer it in evidence as Exhibit No. 273.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 273.")

The Court: Mr. Sullivan, I notice that by referring to exhibit No. 272 and also 273, and comparing the comparable national exhibits of 262 and 263, that, for instance, on the exhibit 272, first, that your Southern Pacific, Pacific Lines, shown would indicate in the first two blocks of years, 1923 to 1928, and 1929 to 1934, that you had a higher average than what the national picture shows?

A. That is correct.

Q. And the same thing is true as to exhibit 273, comparing it with No. 263, at least on a man-hour basis, whereas, in the last block, the four years 1935 to 1938, on both exhibits the Southern Pacific showing is superior to that of the national, that is, you have a lower rate there?

The Witness: Your Honor, what exhibits were you comparing, 272 with——

The Court: 272 with 262, and 273 with 263. To restate [fol. 3666] that a little more condensed, if I have correctly interpreted your exhibits, for the first two blocks of years your total casualties on the average were in excess of the national picture, but the last four years the average of the Southern Pacific is less than the national picture.

A. Your Honor, Exhibit 273 cannot be compared properly with No. 263, because 273 includes all trainmen on duty, whereas Exhibit 263 is confined to road trainmen and enginemen.

Q. But I understood you to say that the two exhibits were comparable.

A. I must have misunderstood the reference. It is not possible to make an exhibit for the Southern Pacific using as a basis the accident bulletins of the Interstate Commerce Commission, for the reason that no segregation is made in the accident bulletin as between trainmen of the various groups for individual railroads, so I was in error when I stated that Exhibit 273 was comparable to exhibit 263.

Mr. Mason: You mean it is not possible to make an exhibit like No. 263 for the Southern Pacific?

A. That is correct.

The Court: Then may I ask you if Exhibit 272 is compar-
[fol. 3667] able to No. 262?

A. It is as to the basic data and the casualty rate on a locomotive-mile basis.

Mr. Mason: Now, Mr. Sullivan, does exhibit No. 273 include more employees than are included in No. 263? By that, I mean more classes of employees, or fewer?

A. What exhibit?

Q. 273.

A. I think the Court asked about Exhibit 272 and No. 262.

Q. You have explained that. I will ask you this, exhibit 273, if I understand you correctly, includes train and engine employees on duty in both road service and yard service?

A. That is correct.

Q. And Exhibit 263 includes train and engine employees on duty in road service but not in yard service?

A. That is correct.

Q. And that is the only reason why the two exhibits are not comparable?

A. That is correct.

Q. So that if the casualty rates on exhibit No. 273 are less per hundred million locomotive-miles, man-hours, or
[fol. 3668] car-miles, than those exhibited on 263, that is in spite of the fact that a greater class of employees is stated?

A. That is correct, in 273.

Mr. Booth: I am not sure whether I offered this exhibit 273.

The Clerk: It was admitted.

Mr. Booth: Mr. Sullivan, referring to this exhibit 274——

The Court: You haven't got to 274 yet.

Mr. Booth: Referring to this exhibit 273, casualties to trainmen on duty, you show in here the number of man-hours worked by the trainmen on duty, and in connection with the last exhibit you spoke of the influence of the increased traffic in 1937. Now, column E in this exhibit is expressed in thousands of man-hours, is it not?

A. Column C.

Q. Column C, yes. 21,519,000 man-hours worked in 1937, is that correct?

A. That is right.

Q. As compared with 19,214,000 in 1936, the preceding year; and with 17,855,000 in 1938?

A. That is right.

Q. Does that show the additional employment of men that you referred to in connection with the preceding exhibit, increase in the man-hours?

[fol. 3669] A. Well, it is reflected partly, but this represents the actual man-hours worked.

Q. Well, does this show the increased traffic also in column D of 1937 over preceding years?

A. Yes. Column D reflects the traffic in car-miles by thousands.

Q. And it shows that a larger number of car-miles were run in 1937 than was run in any year since 1929?

A. That is correct.

The Court: Hence, on a percentage basis there naturally would be more accidents, is that true?

A. Yes, any increase in traffic exposes more men to injury, but experience shows that accidents increase at a faster rate than the increase in the amount or the volume of traffic.

Mr. Booth: Can that be developed by plotting curves on some of these exhibits you have introduced here?

A. Well, partially so, but it isn't so true always with an individual railroad, but over a cycle of years, and taking the experience of railroads generally, that is what it shows, and that is what the Interstate Commerce Commission has found.

[fol. 3670] Mr. Booth: We have come to the end of our Pacific System exhibits.

The Court: The court will be at recess until ten o'clock tomorrow morning.

(Thereupon, the court stood at recess until February 6, 1941, at ten o'clock A. M.)

[fol. 3671] February 6, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: You may proceed.

JOHN J. SULLIVAN was recalled to the stand and testified further as follows:

Direct examination (Continued).

By Mr. Booth:

Q. Mr. Sullivan, have you prepared an exhibit entitled "Southern Pacific Company, Pacific Lines. Detail of Casualties to all Classes of Employes on Duty, Sustained in Train and Train-Service Accidents, Road Freight Train Operation, Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, State of Arizona?"

A. I have.

Mr. Booth: Consisting of twelve sheets. We ask that this be marked No. 274 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 274 for identification.

Mr. Booth: For the years 1923 to 1935, inclusive, calendar [fol. 3672] years, from what source was this exhibit prepared?

A. From the photostatic copies of the original form T reports filed with the Interstate Commerce Commission certified to over the signature of the secretary of the Interstate Commerce Commission and the seal of the Commission.

Q. Those were procured by you for use in the Nevada Train Limit case, were they?

A. They were.

Q. Have you those certified copies here in Tucson?

A. I have.

Q. Are they available to counsel?

A. They are.

Q. For the years 1936 to 1939, inclusive, from what source was this exhibit exclusively prepared?

A. From the office files of the true carbon copies of the form T's prepared by the Southern Pacific Company for the Interstate Commerce Commission.

Q. Have you those office copies here with you?

A. I have.

Q. Will you explain the exhibits by columns on the first page, all of the columns being identical on the other pages? In the first place, it is arranged by years, is it not?

[fol. 3673] A. It is.

Q. And the items are all numbered consecutively?

A. They are.

Q. Now, please explain the columns?

A. The exhibit consists of a brief analysis in tabular form showing the date of the accident in which the casualty occurred, the location of the accident, the class prescribed by the Interstate Commere Commission for classifying the accident, the identification of the train by train number, the number of cars in the train, the speed in miles per hour, the name and occupation of the person injured, and the disability, either actual or estimated, as the case may be.

Q. As stated in the form T?

A. As stated, in most cases, in the form T; and a brief description of the accident, all of the information being shown on the form T either in tabular form or in the narrative. The accidents generally appear in chronological order, that is, for each year they appear throughout the year as they occurred, and the same operation is extended throughout the entire twelve sheets of the exhibit.

Q. I notice that the title of this exhibit says "Reportable [fol. 3674] to the Interstate Commerce Commission." Did you make an independent examination of certain company records to determine whether these form T's actually embrace all of the accidents for that period?

A. I did for the period from 1923 to 1935, inclusive.

Q. What did you examine?

A. I examined the certified copies of the form T reports, the records of the general claim agent, whose responsibility it was to receive reports and make settlements in connection

with personal injuries, and admission records and treatment records of the general hospital department.

Q. What do you mean by "general hospital admission records?"

A. When an injured employee or one who is ill is admitted to the general hospital of the company, or treatment for illness or injury is made to an employee, a report is maintained in the general hospital department of such injuries.

Q. To the best of your knowledge and belief, is this exhibit true and correct as to what it purports to be?

A. Yes, but in connection with the questions that I was just asked pertaining to the detail list of casualties in the [fol. 3675] state of Arizona covered by Exhibit 274 for identification, there were no casualties reportable that were not reported to the Interstate Commerce Commission.

Q. This is confined to all classes of employees on duty sustained in train and train-service accidents?

A. In road freight train operation.

Q. In road freight train operation?

A. That is correct.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: Do you know whether the reports were made to the Arizona Corporation Commission on these same accidents?

A. I don't know of my own knowledge; but I do know that for some of the early years, copies of the original reports could not be found in the office of the Corporation Commission in 1929, but at that time carbon copies of the records were available, and we found that the reports had been made to the Corporation Commission.

Q. The practice now is to make the same reports, same type of report to the Arizona Corporation Commission as is made to the I. C. C.?

A. That is correct, and on the same basis.

Q. Do you know how long that practice has prevailed?

[fol. 3676] A. I don't know how much earlier, but I know that the practice was in effect in 1916.

Q. Their forms did vary, however, for a while?

A. They did; they were not uniform, I don't recall the year, but it has been a number of years ago, the Corporation Commission adopted as their rules the rules of the In-

terstate Commerce Commission for the reporting of train and train-service accidents.

The Court: This exhibit covers any casualties to those who work on the tracks, such as section hands?

A. Yes, if road freight train operation was responsible for the injury.

Q. I notice also that a special officer is listed here in one of the exhibits, or one of the sheets.

A. That is correct, your Honor, and likewise if reference is made to item 28 on the first sheet, you will find reference to a water service foreman. All classes of employees on duty, regardless of their occupation, are shown on this exhibit, if the injury was received incidental to the operation of a road freight train.

Mr. Booth: Does this include accidents in yards while [fol. 3677] a road freight train was being made up or broken up?

A. No, that is not considered under the rules road freight train operation.

Q. But if an accident occurs while a road freight train is coming into the yard, and before it is turned over to the yard crew for handling, that accident would be in here?

A. If the train is still in charge of the road crew, it would be reported.

Q. And similarly, after a train is made up in the yard, and is taken charge of by the engineer, conductor and the other members of the crew, and the accident occurs either while the train is standing still or getting under way, that would be reported?

A. If the employee was on duty in connection with it.

Q. That would be included in this exhibit?

A. It would.

Mr. Booth: We offer this in evidence as defendant's Exhibit No. 274.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred was received in evidence and marked "Defendant's Exhibit No. 274.")

[fol. 3678] Mr. Booth:

Q. Mr. Sullivan, have you prepared an exhibit consisting of seven sheets similar to exhibit No. 274, identical in title with the exception that it relates to the state of Nevada?

A. I have.

Mr. Booth: May we have this marked for identification as No. 275?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 275 for identification.

Mr. Booth:

Q. Of how many items does this exhibit consist?

A. 275.

Q. Are the items numbered consecutively on the lefthand margin from 1 to 275, inclusive?

A. They are, beginning with No. 1 on the first sheet.

Q. Opposite what items and in column No. 9 are found the letters "(N. R.)" in capital letters and brackets and please give the page of the exhibit and the number of the item?

A. On sheet No. 3 of the sheet, item 122; sheet No. 4, item 141.

Q. That covers injury to two persons, does it not?

A. It does. Item 142, item 164; sheet No. 5, item 176, [fol. 3679] item 178, item 188, item 190, item 198.

Q. You have given nine items with two injuries in item 141, or ten injuries altogether?

A. That is correct.

Q. What do the letters "N. R." stand for in this exhibit?

A. As indicated in the legend of the sheets, each was a casualty that was properly reportable under the rules, but was not reported on form T to the Interstate Commerce Commission.

Q. Did you make the same check of records in the superintendent's office, hospital department, and the claims attorney's department in the course of preparing for the trial of the Nevada Train Limit case that you did as to Arizona as you have described?

A. I did.

Q. Were these items developed by you, these items that were not reported in the course of that check?

A. They were.

Q. Did you prepare exhibits in the Nevada Train Limit case making a showing of reportable casualties in Nevada for the years 1923 to 1935, inclusive?

A. Yes, there were two series of exhibits. The first ex-
[fol. 3680] hibits were for the years 1923 to 1934, and later the figures for the year 1935 had become available and the previous exhibits were brought up to date to include the year 1935.

Q. Were these items shown as not reported, in this exhibit, finally included in the exhibits in the Nevada Train Limit case?

A. They were finally.

Q. As to the items in this exhibit No. 275 for identification which are not marked with the letters "N. R.", from what source is the information taken?

A. For the years 1923 to 1935, inclusive, from the certified photostatic copies of the original reports made to the Interstate Commerce Commission as I have previously described.

Q. That is, you had available at that time certified copies of both Arizona and Nevada of the form T reports?

A. Before the exhibit was finally completed.

Q. From what source were the items in this exhibit taken as to the items not marked with "N. R." from January 1, 1936, to December 31, 1939?

A. When the fact that these reportable accidents——

Mr. Booth (Interrupting): I don't think you got my
[fol. 3681] question.

The Court: Read the question.

(The question was read by the reporter.)

A. From the true carbon copies of the office files of the original form T's made by the Southern Pacific Company to the Interstate Commerce Commission.

Mr. Booth:

Q. Have you here in Tucson at our office across the street from the courthouse the certified copies you have referred to?

A. I have.

Q. Have you the office copies, the record copies of the form T's from January 1, 1936, to December 31, 1939?

A. I have.

Q. Is this exhibit true and correct to the best of your knowledge and belief?

A. It is.

Mr. Booth: I will state to the Court that we haven't here in the courtroom or in Tucson any supporting documents for these items marked "N. R." We were in this position in regard to those, we couldn't very well produce an exhibit before the court and call it an exhibit of reported accidents when the records in the Nevada case show very clearly there were nine accidents and ten casualties that [fol. 3682] were not reported to the Commission. It is my understanding that in all probability the files in the superintendent's office showing those accidents have been destroyed. The law requires them to be kept for only three years, and storage space is a considerable item in the division office. I am pretty sure that enough of the claims department files are in existence to identify these accidents and perhaps give a description of them, and it may be that the hospital department records are in existence, although that I doubt. I will undertake to bring those here, whatever we can find, if the superintendent's files haven't been destroyed; and I will have those here as to the nine accidents when we resume after a brief recess.

Mr. Strouss: I don't think you need to do that, Mr. Booth, unless I should ask for them. I would like to look the exhibit over before I say I would not want those records, but now my anticipation is that I would not require you to bring them, but I would like to look the exhibit over first.

The Court:

Q. Mr. Sullivan, why weren't these accidents reported?

A. I don't know, sir. It may be inadvertence; but of my own knowledge I do not know why they were not reported. [fol. 3683] I had no jurisdiction or responsibility in Nevada at the time these accidents occurred and were not reported; I was working on another part of the system.

Q. There is no such occurrence here in the exhibit affecting the state of Arizona?

A. No, sir, not a single one.

Q. I notice these last two exhibits cover the years 1923 to 1939, inclusive, whereas your national showing only brought it up to and including the year 1938?

A. As to the Southern Pacific, all basic data and records are available for 1939 and, as I explained yesterday, the statistical accident bulletin for the year 1939 has not yet been distributed by the Interstate Commerce Commission.

Q. Another thing, in the case of exhibit No. 274 which covers the casualties in the state of Arizona, I understand that is all of the casualties occurring within the physical boundaries of the state and is not limited to the Tucson division?

A. It includes not all of the casualties; but it includes all casualties to employees on duty within the physical boundaries of the state of Arizona involving road freight train operation only.

[fol. 3684] Q. Those things that it purports to show?

A. That is correct.

Q. Is the same thing true of exhibit No. 275, it doesn't cover the Salt Lake division but it actually covers the casualties occurring in freight train operation within the physical boundaries of the state of Nevada?

A. That is correct.

Mr. Booth:

Q. These are special studies not found in any published statistics, are they?

A. It is a special study and not found in any statistical showing of any kind.

The Court: In the ordinary course of events, I presume you would keep track of these accidents by divisions, would you not?

A. That is true.

Q. This is a special study to compile these particular exhibits?

A. That is correct.

Mr. Booth:

Q. For what length of time can you estimate were you at work on these two exhibits, including your work in the Nevada case and your work in preparation for this case?

A. It would be hard to say for the particular exhibits, but in preparation for the Nevada case all of the statistical showing and some operating testimony I was at work for a [fol. 3685] year. In preparation for the trial of this case, about seven months.

The Court: I understood the question had reference to the length of time it took you to make this particular study in connection with these exhibits?

A. I couldn't determine or state the amount of time for this particular study, because it was all interrelated, and a number of exhibits have their foundation in this particular detailed list.

Mr. Strouss: I don't see where that has any relevancy anyway.

Mr. Booth: It has this relevancy, we didn't go to the trouble and expense of making a system showing as elaborate as this. This explains the reason why we made the system showing by Interstate Commerce Commission statistics, and made this showing by states.

Mr. Strouss: There is one part of the testimony before this exhibit is offered that I want to move to strike and that is as to these nonreported casualties having been admitted in evidence in Nevada. That is hardly competent or relevant testimony before this court.

Mr. Booth: I made that as a statement to the court. If [fol. 3686] it is evidence, it may go out.

The Court: It may be stricken because this case must stand on its own bottom and not on what may have occurred in Nevada.

Mr. Booth: I was explaining our quandary in preparing this exhibit.

Q. Mr. Sullivan, in 1935 was a checking system put into effect in the general manager's office to obviate the occurrence or recurrence of failure to report reportable casualties?

A. It was.

Q. Of what did that consist and is it in effect now?

A. Accidents are reported to the general manager by telegraph, and in those cases where injuries occur a copy of the telegraphic report is passed to an organization known as the "Central Timekeeping Bureau." That accident report is kept in what is termed "suspense" and checked to see whether or not time is lost by the employee shown on the report and if loss of time is indicated it serves as an index for reporting the accident in the event it might have been overlooked. It is used as a checking basis only.

Q. Has that system been in effect since 1935?

A. It was placed in effect in 1935.

[fol. 3687] Q. And has been in effect since?

A. I don't know; I presume that it has.

The Court:

Q. Mr. Sullivan, with reference to both those last two exhibits introduced this morning, I notice there is no summary in connection with it. Does the report itself, is it possible to summarize the data therein contained?

A. Summaries will be offered in exhibits later.

Mr. Booth: We offer this exhibit in evidence as defendant's exhibit No. 275.

Mr. Strouss: I object to it as irrelevant and immaterial.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 275.")

[fol. 3688] Mr. Booth: Mr. Sullivan, did the certified copies of the form T's for Arizona and Nevada for the years 1923 to 1935, inclusive, to which you have referred in connection with the two preceding exhibits, and which you have here in Tucson, include all reported accidents to all classes of employees on duty in all classes of service?

A. Yes.

Q. And have you examined, and have you with you here in Tucson, the office copies to which you have referred, of all form T's for the calendar years 1936 to 1939, inclusive, for all classes of employees on duty in all classes of service in the states of Nevada and Arizona?

A. I have.

Q. Have you prepared an exhibit in one sheet entitled "Comparison of Casualties to all Classes of Employes on Duty, all Classes of Service, Sustained in Trains and Train-Service Accidents, Reportable to the Interstate Commerce Commission for the years 1923 to 1939, Inclusive, Southern Pacific Lines, States of Nevada and Arizona?"

A. I have.

Mr. Booth: We ask that that be marked No. 276 for identification.

[fol. 3689] The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 276 for identification.

Mr. Booth: Will you please describe this exhibit, Mr. Sullivan?

A. The exhibit is arranged to show the information by years from 1923 to 1939, inclusive, subdivided into cycles of years, the two early periods six and six years respectively, and the last cycle a five-year period, 1935 to 1939. The source of the figures of total locomotive miles, thousands, for Nevada, is the annual report of the Southern Pacific Company to the Public Service Commission of Nevada, Column C, showing the same information for Arizona, is from annual reports of the Southern Pacific Company to the Arizona Corporation Commission. The data shown in columns D to G, representing the employes on duty killed and injured in Nevada and Arizona, are from the form T reports which I have previously referred to. Columns H and I, showing the total casualties, and columns J and K, showing the casualty rate on a locomotive-mile basis, as well as the figures in items or lines 7, 14, and 20 to 26, inclusive, are computations by me. The exhibit as to casualties to all classes of employees on duty includes all classes of service, including freight, passenger and [fol. 3690] yard.

Q. I see you have put on here a table showing the main track mileage. Is that table correct in accordance with what it purports to state?

A. It is. It represents the main track mileage, both main line and branch, as described in the block at the foot of the exhibit for both Arizona and Nevada.

Q. You have a footnote here opposite the star, "Includes 13 killed and 12 injured in derailment of streamliner City of San Francisco at Harney, Nevada, August 12, 1939, caused by malicious tampering with the track." Now, have you with you here the quarterly report of the I. C. C. Bureau of Investigation finding that that accident was caused by malicious tampering with track?

A. I haven't the quarterly summary, but I have a copy of the individual report.

Q. By the way, how many cars did that train have?

A. I also have the quarterly bulletin, I beg your pardon; and I have the individual report also. It was a fourteen-car train.

Q. Streamlined?

A. Yes.

Q. Steam or Diesel power?

[fol. 3691] A. Diesel powered.

Mr. Booth: Have you any questions, Mr. Strouss, on this exhibit?

Mr. Strouss: These locomotive-miles, of course, includes helper locomotives and light locomotives?

A. It includes all locomotive-miles, Mr. Strouss, including yard locomotive-miles, light and freight, as well as passenger train.

Mr. Booth: The exhibit includes yard accidents?

A. That is correct.

Mr. Booth: We offer the exhibit in evidence.

Mr. Strouss: Objected to as irrelevant and immaterial.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 276.")

Mr. Booth: Mr. Sullivan, have you prepared an exhibit in the same form as exhibit No. 276, but showing merely a comparison of casualties to all classes of employees on duty, road freight train operation, Southern Pacific Lines, states of Nevada and Arizona?

A. The exhibit is similar but it shows different basic data and the casualty rate on additional bases, but it is confined solely to a showing for the states of Nevada and [fol. 3692] Arizona.

Q. I omitted to ask you with reference to Exhibit No. 276 whether that exhibit includes the nine non-reported accidents and ten casualties which were testified to in connection with the list of accidents in Nevada?

A. It does.

Q. Does this exhibit No. 277 for identification include those?

A. It does.

Q. Will you please describe the exhibit, the sources from which it is derived?

A. The exhibit is prepared the same as the one immediately preceding it, showing the figures by years and cycles of years, the basic data. Freight train miles and freight train car-miles for Nevada in columns B and D were obtained from the annual reports of the Southern Pacific Company to the Nevada Public Service Commission; columns C and E for Arizona from the annual reports of the

Southern Pacific Company to the Arizona Corporation Commission; the figures in columns F, G, H, and I from the form T reports, as previously described, and for the state of Nevada the ten casualties which were not reported but which are detailed on Exhibit No. 275; the figures in columns J and K indicating the total casualties, and columns [fol. 3693] L and M, showing the casualty rate on train-mile basis, and N and O, the casualty rate on a car-mile basis; and the figures in items or lines 7, 14, and 20 to 26, inclusive, are computations by myself. I may state that I have used the freight train-mile basis and the car-mile basis, the train-miles basis being a measurement of the exposure to injury, and the car-mile basis a measurement of casualties against the movement of a given amount of traffic.

Q. Is this exhibit true and correct, to the best of your knowledge and belief?

A. It is.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: This exhibit, I note, has on the bottom, "Comparison of main track mileage operated as of December 31, 1939." Of course, that mileage is not the same as was operated in 1923, for example?

A. No, that is correct. In fact, it changes from year to year.

Q. In 1923, in Arizona, neither the E. P. & S. W. Lines, nor the Arizona Eastern had been added to the Southern Pacific Company's operations at that time, had they?

[fol. 3694] A. They had not.

The Court: Well, this last exhibit has to do with the freight train operations and is a further break-down of 276. In other words, the casualties shown there in 276 are included in this exhibit 277?

A. That is correct as to road freight train operations. In other words, we have eliminated in exhibit 277 the casualties that might have occurred in other classes of service other than road freight train operation.

Mr. Booth: We offer this in evidence as defendant's Exhibit No. 277.

Mr. Strouss: Objected to as irrelevant and immaterial.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence, and marked "Defendant's Exhibit 277.")

Mr. Booth: Have you prepared an exhibit in one sheet showing the casualties to all classes of employees on duty in road freight train operation sustained in train and train-service accidents reportable to the Interstate Commerce Commission, classified as to causes and classes of employees for the years 1923 to 1935, inclusive, for the states [fol. 3695] of Nevada and Arizona?

A. I have.

Mr. Booth: We ask that this be marked for identification as defendant's Exhibit 278.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 278 for identification.

Mr. Booth: To which of your exhibits is this a supplement?

A. No. 277.

Q. Should No. 277 be inserted in the fourth line in the title to the exhibit?

A. It should.

Mr. Booth: May the Clerk make that insertion?

The Court: Yes, it may be inserted.

Mr. Booth: Now, will you explain this exhibit, Mr. Sullivan?

A. In the submission of form T's by the carrier to the Interstate Commerce Commission, the rules require that the class of train accident or train-service accident be incorporated in the proper place on the form. As I have previously described, train accidents are subdivided into five general classes, train-service accidents in ten subdivisions.

Q. Major subdivisions?

[fol. 3696] A. Well, they are subdivisions. Train service accident is really the major subdivision, and these ten subclasses are subdivisions of train service accidents. For instance, an accident occurring to employees while coupling or uncoupling locomotives or cars, is shown as I. C. C. class S-a, likewise coupling or uncoupling air-hose, S-b, operating locomotives, S-c, operating handbrakes, S-d, and so on. The casualties included on exhibit 277 have been

classified on exhibit 278 for identification, both as to the class of accidents and the class of employees, columns C to F, showing the injuries reportable to conductors, brakemen and flagmen; columns G to J to engineers and firemen; columns K to N to all other classes of employees other than conductors, brakemen, flagmen, engineers and firemen, and columns O to R, inclusive, show the total for all employees. These casualties are grouped into cycles of years for the same period as indicated on exhibit 277 and a grand total has been computed in item or line 16 to show for the various three periods, six years, six years, and five years, respectively, and a grand total, the total number of casualties, both killed and injured, occurring in those years for each of the described classes of employees. It is a break-
[fol. 3697] down of exhibit 277 by causes and classes of employees.

Q. What does "locomotive boiler (B)" include in the way of accidents?

A. That would include any casualties resulting from the explosion of a locomotive boiler.

Q. And the next item 4, "other locomotive (L)"?

A. That would include any other defect or failure in a locomotive where the damage to the equipment or the company property exceeded $150 and employees had been injured in that type of accident, such as the failures of rods, wheels or tires, locomotive axles, or any other appurtenances of the locomotive itself.

Q. Suppose an employee had been injured to the extent of losing more than 72 hours' time and the damage did not amount to $150, but was due to some part of the locomotive breaking, would that be shown on here?

A. If it was either the engineer or fireman operating the locomotive, it would be shown in item 8, "operating locomotives."

Q. Is this exhibit true and correct, to the best of your knowledge and belief?

A. It is.

Mr. Booth: Any questions, Mr. Strouss?

[fol. 3698] Mr. Strouss: No questions.

Mr. Booth: Your Honor?

The Court: No.

Mr. Booth: We offer this in evidence as defendant's exhibit No. 278.

Mr. Strouss: Objected to as irrelevant and immaterial.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 278.")

Mr. Booth: According to this exhibit, there has been no locomotive boiler explosion causing a casualty in either of these states?

A. That is correct.

Q. During the period covered by this exhibit?

The Court: That would be such an occurrence as happened in Denver in the last two weeks on the D. & R. G.?

A. It would be, your Honor, if the press reports are correct.

Mr. Booth: What class of accidents would this item 13 cover, "Accidents at Highway Grade Crossings?"

A. That would include injuries to employees in a grade crossing accident on account of the operation of a locomo-
[fol. 3699] tive, or train, or car colliding with a vehicle or striking a pedestrian where a derailment did not occur, and where there was damage less than $150 to the company property or equipment. If a derailment or other train accident occurred where damage to railroad property or equipment exceeded $150, it would be reported in item 5, miscellaneous train accidents.

Q. Now, let us turn back to defendant's Exhibit 274, item 10, "J. Breseno, track walker, 13 days' disability," would that be shown on this exhibit 278? I mean, would it be included in it, and, if so, in what subdivision?

A. That would be reported in item 14 of exhibit 278, "struck or run over by cars or locomotives," or, depending upon the circumstances, it may be included in item 15. That particular casualty is reported in item 14.

Q. On sheet 4 of this exhibit 274 you have item 140, "J. Chavez, track laborer, struck by train, ten days' disability." Now, from that description can you tell in what item the accident would fall in No. 278?

A. Item 14, S-i, struck or run over by cars or locomotives; and it would be shown under the column "All other employees," column N, the accident having occurred in
[fol. 3700] Arizona.

Q. Would this table include an employee dead-heading in a caboose on his way to an assignment for service?

A. No, because an employee deadheading is not considered on duty.

The Court: He is being paid, isn't he?

A. Yes, but the Interstate Commerce Commission classes employees traveling but not on duty even though under pay as employees off duty.

Q. Is that included in their classification of "time paid for but not worked?"

A. Yes, sir. I may describe that further. If the deadheaded employee is traveling on a passenger train, under the rules of the Commission he would not be classified as an employee either on duty or off duty, but as a passenger.

The Court: Then, would he receive any protection if he was injured?

A. You mean from the standpoint of compensation?

Q. Yes.

A. I think he would. That is out of my department, but I think they do.

Mr. Booth: Suppose I was injured coming down here to Tucson, would I be classified as a passenger?

[fol. 3701] A. Yes, sir.

The Court: We will take our morning recess.

(Thereupon, a short recess was taken, after which the witness was recalled to the stand, and proceedings were resumed as follows:)

[fol. 3702] Mr. Booth: Mr. Sullivan, have you prepared an exhibit in one sheet that is a further breakdown of exhibit No. 277 and relates to road freight conductors, brakemen, and flagmen on duty exclusive of engineers and firemen?

A. I have.

Mr. Booth: We ask that that be marked as "Defendant's Exhibit No. 279"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 279 for identification.

Mr. Booth:

Q. This exhibit is in the same form and from the same sources and on the same basis as exhibit No. 277, is it not?

A. That is correct.

Q. What employees included in exhibit No. 277 are excluded from this exhibit?

A. All classes of employees are excluded except road freight conductors, brakemen, and flagmen on duty.

Q. The term "flagmen" is applied to the rear brakemen where it is used without any qualification, isn't it?

A. Yes, that is a term used by the Interstate Commerce Commission in their classification of employees, but the [fol. 3703] flagman is one of the brakemen on the freight train crew.

Q. Referred to by that term, I believe, in the Arizona full-crew law, is it not?

A. Yes, sir.

Q. Will you describe this exhibit, please?

A. The exhibit is prepared in exactly the same form as exhibit No. 278. The basic figures in columns B to E are the same freight train-miles and freight train car-miles. Columns F, G, H, and I are the casualties to road freight conductors, brakemen, and flagmen on duty only but which are included also in the preceding exhibit No. 277. Like the other exhibits, columns J to O, inclusive, and the figures in lines 7, 14, and 20 to 26, inclusive, are calculations by myself.

Q. These casualty rates are estimated on the basis of per million train-miles and per hundred million car-miles.

A. Not estimated, but calculated on the basis of per million train-miles and per hundred million car-miles. As I previously explained, train-miles to show the relative exposure to injury, the car-mile basis to indicate the occurrence of casualties in the movement of a given amount of traffic.

The Court: Mr. Sullivan, from these various exhibits it would appear that as compared with the engineers and [fol. 3704] firemen the conductors, brakemen, and flagmen have a more hazardous occupation?

A. There are more injuries, that is true. Of course, there is an explanation that may be seen by an examination of exhibit No. 278. Engineers and firemen, except in unusual cases, are not required to couple or uncouple locomotives or cars or air hose or steam hose or safety chains. In the performance of their duties, they are always on the moving

locomotive, they are not required to get on and off a moving locomotive. They are not required to operate hand brakes and rarely are required to operate switches unless they are on a light engine, and it is seldom while they are on duty that they are exposed to the other type of injury, being struck or run over by locomotives or cars. As to engineers and firemen they are exposed to one type of accident that only one member of the train crew is exposed to and that is collisions and the collisions and derailments resulting from striking vehicles at grade crossings.

Mr. Strouss: That does not include all collisions, does it, as classified by the Interstate Commerce Commission?

A. Yes, if they were injured, they would be included be-
[fol. 3705] cause this exhibit includes both train and train-service accidents.

Q. When you say "collisions" that includes collisions between cars that may be switched or collisions of that sort as well as collisions between engines?

A. That is true, but head-on collisions invariably involve one or more locomotives and the engineer and fireman on those locomotives.

Q. Of course the trainman would be exposed if he were on cars that collided in switching?

A. Yes, and the trainmen are exposed to the rear-end collisions.

Mr. Booth: We offer this in evidence.

Mr. Strouss: I object to it as irrelevant and immaterial.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 279.")

Mr. Booth:

Q. Following that thought a little further regarding the relative exposure to hazard of engineers and firemen as contrasted with the conductors and brakemen, there is only one engineer and he is matched by one conductor, is that correct?

[fol. 3706] A. That is correct.

Q. And one fireman, you could match him off with the head brakeman?

A. That is correct.

Q. There is always at least one more brakeman and sometimes, or usually, more than one?

A. For the purpose of this exhibit, there are at least two, both in Arizona and Nevada.

Q. So that that would have to be taken into consideration?

A. Yes, there are more road conductors, brakemen, and flagmen exposed to injury than there are engineers and firemen.

Q. You are familiar with the operating rules of the Southern Pacific Company as they have existed during your period of service, are you not?

A. Yes, sir.

Q. You have been train master on this division and assistant superintendent on the divisions you mentioned in your testimony?

A. Yes.

Q. Inspector of transportation and so on?

A. Yes.

Q. What do our rules require and what is the practice where a train takes a siding for another train to meet or pass it with respect to the brakeman getting on and off the [fol. 3707] train that takes the siding?

A. It is required that someone throw the switch for the train to enter the siding and if it is a train on which a train crew is employed it is the duty of a member of the train crew to get off the train and throw the switch. Leaving the siding, the switch must be thrown back for the main line and the member of the train crew must board the train before it proceeds from that station.

Q. Under our operating rules and practices, when the train approaching a siding intending to take that siding for the purpose of allowing another train to meet or pass it, does the head brakeman usually throw the switch?

A. Yes, that is the invariable practice.

Q. Who closes the switch as the train leaves the siding?

A. A member of the train crew, usually the rear brakeman but occasionally the conductor.

Q. Does the rear brakeman have to close the entering switch after the train has gone into the siding?

A. Yes.

Q. And open the leaving switch as the train departs?

[fol. 3708] A. No, the head brakeman usually opens the leaving switch when the train departs and usually the rear

brakeman closes the switch after the train has left the siding.

The Court: That necessitates bringing the train to a stop or practically so?

A. Practically so but not always. It depends upon the conditions generally. Pulling out of a siding, it is the invariable practice for the engineer to control the movement of the train at such a slow speed that the brakeman is able to get off, throw the switch, and run and catch the caboose.

Mr. Strouss: If the Court please, I move that be stricken, "invariable practice." That is a conclusion which the witness certainly couldn't know as to what every engineer does.

Mr. Booth:

Q. Is it the practice as you have observed it?

A. It has been the practice as I have observed it and I have ridden in the caboose of a great many freight trains.

The Court: The expression, "invariable practice," may be stricken.

Mr. Booth:

Q. Are there any comments you desire to make on this exhibit No. 279?

[fol. 3709] A. The exhibit has been prepared in such a way that the casualty rates both on a train-miles basis and on a car-mile basis may be readily compared, one state with the other. It has also been prepared in such a way that the trend represented by the various casualty rates may be followed from the earlier years to the latest and through the intermediate years, and also the average casualty rates for the indicated periods of years may be compared one with another and the trend indicated by the rates may be followed from one group of years to the others. In the block represented by lines 22 to 26, inclusive, the percentage figures indicate the decrease in the casualty rates, one period with another, for each of the states and on both a train-mile basis and a car-mile basis. The exhibit itself shows, for instance, referring to column N for Nevada, that the casualty rate on a car-mile basis which represents, of course, injuries to road freight conductors,

brakemen, and flagmen, that the rate was 39.34, whereas in 1939 it had decreased to 4.86. Likewise, in Arizona the rate in 1923, while it was lower than Nevada, it has decreased to 10.51 in 1939, but in that year the rate is still over twice as much in Arizona than in Nevada. For the total seven-[fol. 3710] teen years, it will also be noted that the average casualty rate in Arizona is almost twice that in Nevada. The same comparison may be run through in the casualty rate on a train-mile basis or for any year or cycle of years that are shown and calculated.

The Court: It is true, however, that there is a fourth more mileage in Arizona than there is in Nevada, approximately?

A. The main track mileage over which practically all freight train miles are operated is relatively the same. There are 808.29 main track miles on the main line in Arizona and 819.82 in Nevada. But even if there was a difference, that is compensated for on the basis against which the casualties are measured. Regardless of the mileage, if you had no freight train miles operating, there wouldn't be any employees and there wouldn't be any casualties; for it is only in the movement of freight trains and the movement of freight train cars that we produce the casualties to road freight conductors, brakemen, and flagmen on duty.

Mr. Booth:

Q. I notice in the first block, that is the block of 1923 to 1928, inclusive, the average for those six years on a train-mile basis is 11.44 casualties per million train-miles [fol. 3711] in Nevada and 15.07 in Arizona?

A. That is correct.

Q. Can you give the approximate figures of the statistical length of freight trains in those two states for those six years arrived at by dividing the car-miles by the train-miles?

A. It can be calculated. In Nevada for the six years, 1923 to 1928, the statistical average would be about 58 cars and Arizona, 52.

Q. Take the approximate statistical average for the years 1935 to 1939, inclusive?

A. In Nevada, 77 cars plus, slightly over 77 cars; and Arizona, slightly over 55.

Q. All those figures you gave include the caboose, do they not?

A. Yes, that is simply calculated by dividing the freight train car-miles by the freight train miles.

Q. Have you any added comments on this exhibit?

A. No, sir.

Mr. Strouss:

Q. This includes all operations in either state?

A. It includes all freight train operations.

Q. That would be branch and main line?

A. That is correct.

Q. What about yard?

[fol. 3712] A. No, it does not include yard. Road switching, where it is in charge of the road freight train crew is included in this showing.

Q. That is the way road switching is classified as distinguished from yard, isn't it, the road crew does the switching?

A. They do the switching where a yard engine is not employed.

Q. That would be classified as road switching? I ask that because of the former showing of the distinction on the records of the company as between road switching and yard switching.

A. I don't quite understand your question.

Q. If locomotive-miles in road switching were shown for a division, that would mean the switching was done by the train crew rather than the yard crew?

A. There are no locomotive-miles on these exhibits.

Q. I am asking as to the distinction between road switching and yard switching?

A. Independent of this exhibit?

Q. Yes.

A. That is true. There is a calculation made of switching and that is classified in the Interstate Commerce Com-[fol. 3713] mission rules as road switching. That is included in the locomotive-miles classification.

Q. That type of road switching would be included here, because it would be done by the train crew?

Mr. Mason: I take it you mean if casualties occur, such casualties are included here?

Mr. Strouss: In the train-miles.

The Witness: No, there are no train-miles or car-miles accumulated by switching.

Mr. Strouss: Not even road switching?

A. No, sir.

Mr. Booth: Only locomotive-miles?

A. That is correct.

Q. Have you prepared an exhibit, Mr. Sullivan, making a breakdown of exhibit No. 279 to show the comparison between the states of Nevada and Arizona for the same period of casualties caused from sudden stopping, starting, lurch, and jerk of train?

A. I have.

Mr. Booth: We ask that that be marked "Defendant's Exhibit No. 280"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 280 for identification.

[fol. 3714] Mr. Booth:

Q. Upon what is this exhibit based?

A. The exhibit is based, as in the case of the previous exhibits, on reports of casualties made by the Southern Pacific Company to the Interstate Commerce Commission with the exception that it also includes for the state of Nevada any of the casualties which were not reported and which were caused from sudden stopping, starting, lurch, and jerk of train.

Q. Insofar as casualties are concerned, this is based on exhibits Nos. 274 and 275 which list the casualties in those two states, is that correct?

A. Yes, reference to that will be found there, and references made on exhibits Nos. 274 and 275 to that particular class of casualty by an index reference that is shown at the foot of the sheets on exhibits Nos. 274 and 275, the reference being shown in column No. 3.

The Court: Mr. Sullivan, these casualties caused from sudden stopping, starting, lurch, and jerk of train, do they fall into any particular classification shown on your exhibit No. 278?

A. They could fall under item 2 or item 5 for train accidents. Item 15, which covers the train-service accidents, [fol. 3715] and in each case on exhibits Nos. 274 and 275

they may be traced through the class of Interstate Commerce Commission accidents under column No. 3, which is preceded by the index indicating that the casualty was caused from sudden stopping, starting, lurch, or jerk of train. For instance, item 3 in exhibit No. 275 shows an injury to a brakeman on a 50-car train due to the engineer applying brakes in an emergency to avoid running over the derail. It will be noted that the Interstate Commerce Commission class for that particular accident is S-j. That would be included in that group of miscellaneous train-service accidents covered by exhibit No. 278. Likewise, item 8 shows an Interstate Commerce Commission class M-b in which a brakeman was injured. That is included in item 5, miscellaneous train accidents, on exhibit No. 278 and likewise throughout. In other words, the index of the class of accident is shown in each case on exhibits Nos. 274 and 275 in column No. 3.

[fol. 3716] Mr. Booth: Now, does this exhibit 280 for identification include those accidents, and only those accidents that are identified by the cross mark or number mark in column 3 of exhibits 274 and 275?

A. Yes, that is correct.

Q. Will you describe the exhibit briefly, please?

A. As to the form and the basic data as to freight train-miles and freight train car-miles it is the same as exhibit No. 279; likewise, it only includes the same class of employees, road freight conductors, brakemen and flagmen on duty, but it is confined to the casualties caused by the causes indicated in the title of the exhibit. Columns J to O, inclusive, and in lines or items 7, 14, and 20 to 26 inclusive, are calculations by myself.

Q. Is this exhibit true and correct, to the best of your knowledge and belief?

A. It is.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: We offer it in evidence as defendant's Exhibit 280.

Mr. Strouss: Objected to as irrelevant and immaterial. [fol. 3717.] My objection, if the Court please, I want to say, on these exhibits, is going particularly to the Nevada part of it.

The Court: I so understood it. The objection is overruled. It may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 280.")

The Witness: I want to invite attention to the figures in columns D and E, which apply equally to the companion exhibits, which is confined to road freight trains and the road freight conductors, brakemen and flagmen, that for the 17 years and for the intermediate cycles of years the traffic measured in the freight train car-miles shown in column D and E is practically the same, in Nevada it being slightly more, the 17 years, two billion two hundred twenty-six million, seven hundred sixty thousand, and in Arizona two billion, one hundred twenty-seven million, five hundred fifty-four thousand.

The Court: Your long train operations in Nevada are clearly disclosed by those columns B, C, D and E, in that, as you have just pointed out, your freight train car-miles were more in the state of Nevada than they were in Arizona during the entire period, whereas the train-miles were [fol. 3718] very substantially less in Nevada than they were in Arizona?

A. That is correct.

Mr. Booth: Does that finish your statement, Mr. Sullivan?

A. Yes.

The Court: Isn't it true, Mr. Sullivan, that this is the first exhibit, that I have observed, at least, that shows more casualties in the state of Nevada than in the state of Arizona during the period in question?

A. That is true, but possibly at this point I could invite the Court to refer to exhibit 275, and by an examination of that exhibit it will be found that of the 114 casualties occurring in Nevada, 24 of them occurred on trains of seventy cars and less, 90 on trains of over seventy cars, so, if you should take the casualties shown in columns J and K, in exhibit 280, it will be found that there were 92 in the two states on trains of seventy cars or more, and 124 on trains of seventy cars or less.

Mr. Booth: Is there any Arizona casualty included in this table that happened on a train of more than seventy cars?

A. Yes, in 1937, there were two casualties on a train of [fol. 3719] over seventy cars.

Q. A train at Yuma?

Mr. Strouss: That was just one accident, however, two casualties in one accident.

A. Yes, two casualties in one accident at Yuma on October 21, 1937.

The Court: Was that coming into the Yuma yards from California?

A. Yes, sir.

Q. It was not a long-train operation between Yuma and Tucson?

A. It was not.

Mr. Strouss: Your exhibit doesn't show the number of short trains and number of long trains operated over the period, does it, Mr. Sullivan?

A. No, it does not.

The Court: Well, Mr. Sullivan, from your study of casualties, is there a higher or lower percentage on the main line or on the branch lines, or are they kept separately?

A. They are not kept separately, but that can be determined by an examination of exhibits 274 and 275, which gives the location.

The Court: I might state my purpose in asking that question. Your total mileage in the two states on main [fol. 3720] lines are very closely the same, but if you include your branch lines, then the total mileage in the state of Arizona is a fourth more than it is in the state of Nevada, and I was just wondering whether proportionately there was a larger or lesser percentage of accidents, casualties, on your branch lines than on your main lines?

A. Well, on account of the extent of operation, there is bound to be a considerably fewer casualties on branch lines.

The Court: Based on train-miles or car-miles, either way you want to put it?

A. On any basis, that is true. Attempting to relate casualties to road mileage would be an imperfect basis of comparison. Frequently, on a branch line the service might be mixed train service or it could be local freight service. In any case, whether it is Arizona or Nevada, or branch line or main line, the statistics show that the casualties

are infrequent. Now, considering your branch line operation where possibly there might only be, well, 2500 train-miles in a month, if one casualty should occur on that branch and there had been no casualties over a period, on any basis of measurement the figure would be distorted because it is not truly representative of a big operation as repre- [fol. 3721] sented by the extensive train and car-miles shown on the exhibit; and it is not possible from the statistics that are reported to the Commissions to make a showing on branch or main lines. They are reported all in a lump as we would say, for the entire operation according to the class of service.

The Court: In other words, what you are stating is, in effect, advising the Court that the only fair basis is on a train-mile or on a car-mile basis rather than the track mileage?

A. That is correct, and I have never seen any statistics or anyone attempt to relate the occurrence of either accidents or casualties to road mileage without some reference to the basic statistics, either locomotive-miles, train-miles, car-miles, or, as is used for all classes of accidents, the man-hours.

The Court: Well, of course, that would be true when you came to a percentage proposition as shown, for instance, on exhibit 280, in columns L to O inclusive, but if you went over into the columns as to the actual number of accidents, like columns F to K, inclusive, then in a state where you have twice the mileage, we will say, that you had in another [fol. 3722] state, you would expect, naturally, more accidents; assuming that the traffic was about the same, would you not?

A. You might have them in the aggregate, but that is the reason you level it off or flatten it by using a common basis of measurement to relate one to the other. I think it is elementary that if you would have twice as many train-miles in a state, regardless of the mileage over which it might have been operated, while it doesn't always hold that it would be so, you would expect twice as many casualties because there would be twice as many employees exposed to injury.

Mr. Mason: Mr. Sullivan, is it correct that the train-miles measure the opportunity of exposure to casualty?

A. Yes.

Q. And car-miles represent a measure of the traffic moved against which to measure casualties?

A. That is correct.

Q. And mileage of road operated considered apart——

Mr. Strouss: I think we are getting much too leading here.

Mr. Mason: I will reframe this question.

Q. Will you say whether or not mileage of road operated, [fol. 3723] independent of the traffic moved over it, affords a measure of opportunity for accident?

A. It does not afford a measure of opportunity. It merely provides, at best, a description of that portion of the line which may have accumulated a certain number of train-miles and car-miles.

Q. Now, referring particularly to Arizona and Nevada operations, will you say whether or not there is any substantial operation of trains of more than 70 cars on any of Nevada's branch lines?

A. There is no operation of trains of over seventy cars on Nevada branch lines.

Q. Is there on any of Arizona's branch lines any operation of trains approaching seventy cars in length?

A. Not that I know of.

Q. Are you particularly familiar with Nevada operations during the period to which your exhibits relate?

A. Yes, I am familiar with operations in Nevada.

Q. And to some extent with operations in Arizona, particularly the branch lines?

A. Yes.

Mr. Booth: Mr. Sullivan, have you prepared an exhibit showing fatalities, subsequent fatalities or amputation of [fol. 3724] limbs, road freight conductors, brakemen and flagmen, train and train-service accidents in Nevada and Arizona, during the period covered by the preceding exhibits?

A. I have.

Mr. Booth: We ask that this be marked defendant's Exhibit 281 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 281 for identification.

Mr. Booth: Is this a particular listing of accidents which already appear in preceding exhibits?

A. Yes, they may be found by reference to exhibits 274 and 275 for the states of Nevada and Arizona.

Q. And identified by the dates in column A?

A. That is correct, or by the identity of the person shown in column H.

Q. Did any of these nine accidents and ten casualties that were not reported in Nevada result in a subsequent fatality or amputation of limb?

A. No.

Q. So this statement is based entirely on Form T reports of the Southern Pacific Company to the Interstate Commerce Commission?

[fol. 3725] A. That is correct.

Mr. Booth: Or reports of subsequent fatalities. Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: Your Honor?

The Court: No.

Mr. Booth: We offer this in evidence as defendant's Exhibit No. 281.

Mr. Strouss: Objected to as irrelevant and immaterial.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 281.")

Mr. Booth: Have you prepared an exhibit, Mr. Sullivan, showing a comparison of the three years, 1923 to 1925, inclusive, with the three years, 1937 to 1939, inclusive, the operation of road freight trains in the State of Nevada.

A. I have.

Mr. Booth: We ask that this be marked No. 282 for identification.

The Court: It may be marked.

Mr. Booth: Will you describe this exhibit, please, and the sources from which you obtained it?

A. The source data is the same as I have invited attention [fol. 3726] to for the preceding exhibits. As to the casualties shown in columns F, G, H and I, and the total of them shown in column J, they are included in the Nevada figures, columns F, H and J, on exhibit 277 for the years 1923, 1924, and 1925, the earliest three years, and years 1937, 1938 and

1939; the latest three years. The statistical average of cars per train computed from dividing the train-miles into the freight train car-miles shows the average length of trains for those periods, which indicates that the period from 1923 to 1925 was a relatively short-train period of operation. The years 1937-1939 shows that it was a period of long-train operation. It therefore provides a comparison in exactly the same territory, which was the state of Nevada, of long train operation with a period of short train operation. The casualty rates have been computed on a locomotive-mile and freight train-mile, and the freight train car-mile basis, the figures in columns B, C, and D, having been abstracted from the annual reports of the Southern Pacific Company to the Nevada Public Service Commission for the years shown.

The Court: Which exhibit are you referring to, Mr. Sullivan?

[fol. 3727] A. Exhibit 282 for identification.

Mr. Booth: Is this exhibit true and correct, to the best of your knowledge and belief?

A. It is.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: Any questions, your Honor?

The Court: No.

Mr. Booth: We offer this exhibit in evidence as Defendant's Exhibit No. 282.

Mr. Strouss: Objected to as irrelevant and immaterial.

The Court: Objection overruled. It may be admitted.

(The document referred to was received in evidence and marked, "Defendant's Exhibit No. 282.")

The Court: The court will be at recess until two o'clock.

(Thereupon, the court stood at recess until February 6, 1941, at two o'clock P. M.)

[fol. 3728] 2 P. M., February 6, 1941.

All parties being present as heretofore noted, proceedings were resumed as follows:

The Court: You may proceed.

Mr. Booth: I will ask Mr. Mason to continue the examination, if the Court please.

The Court: There is no objection to that, I take it?

Mr. Strouss: No objection.

JOHN J. SULLIVAN resumed the witness stand.

Mr. Mason:

Q. Mr. Sullivan, referring back to your exhibit No. 282, I don't think any mention was made of these footnotes which appear below the block of figures. I will ask you if these footnotes are substantially the same as the narrative in connection with these accidents as it appears on your exhibit No. 275?

A. They are.

Q. Where do you get this figure shown with the plus sign, "includes 96 freight conductors, brakemen, and flagmen," is that by reference to exhibit No. 275 in the aggregation of figures shown thereon?

A. That is correct, likewise the minus sign.

[fol. 3729] Q. The "28 freight conductors, brakemen, and flagmen"?

A. That is correct.

Q. You speak of a ratio in the body of the exhibit. First of all, in column E, how do you obtain that ratio?

A. That ratio is obtained by dividing train length of the last period, the three years 1937 to 1939, by the figure representing the average train length for the earlier period, 1923 to 1925.

Q. Then, this is a ratio of the larger figure to the smaller and not of the earlier figure to the later?

A. That is right.

Q. When you come to columns K, L, and M, are those the ratio of the larger figure to the smaller?

A. That is right.

Q. And not of the later period to the earlier?

A. That is correct.

Q. Will you say whether or not these ratios should be read as counterbalancing each other rather than side by side?

A. They should be read independently for each column.

Q. I mean the ratio, for example, in column E and the [fol. 3730] ratio in column K, one of those is a ratio of the later period against an earlier, and the other is a ratio of the earlier period against a later, isn't it?

A. Possibly I had better explain what the figure represents. The train length in the later period, 1937-1939, was 1.48 longer than during the short train period, almost one and a half greater. The casualty rate for the earlier or short train period, based on locomotive-miles, was 2.82 times as great as it was in the long train period of 1937-1939; and the train-mile casualty rate for the early short train period was 2.88 times the casualty rate of the long train period; and on a freight-car-mile basis the casualty rate was 4.27 higher or greater in the short train period than it was in the long train period. In other words, there were 4.27 times as many casualties in the short train period, measured on a car-mile basis, than there were in the long train period of 1937-1939.

Q. Are these averages of cars per train inclusive or exclusive of caboose?

A. They are inclusive of caboose.

Q. If I understand you correctly, and I am undertaking to summarize for my own information, you show by column E that trains in the earlier period were two-thirds as long, [fol. 3731] on the average, and by column M that accidents were four times as frequent in proportion to car-miles, is that correct?

A. That is correct.

Q. Will you take up a statement in two sheets entitled, "Casualties to All Classes of Employes Off Duty, Road Freight Train Operation, Sustained in Train and Train Service Accidents Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, State of Arizona"?

A. That is correct.

Q. Was this exhibit prepared by you?

A. It was.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 283" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 283 for identification.

Mr. Mason:

Q. I take it you have already explained the source showing of freight train miles and freight train car-miles and that that source is the same as on preceding exhibits where these figures are shown?

A. That is correct.

Q. What is the source of the casualty showing?

[fol. 3732] A. The same source as the casualty figures in the preceding exhibits, the certified copies of the photostatic copies, form T, made by the Southern Pacific Company for the Interstate Commerce Commission for the years 1923 to 1935, inclusive, and for 1936 to 1939 true carbon copies of the original form T's made by the Southern Pacific Company to the Interstate Commerce Commission.

Q. You show in column J of the first sheet of the exhibit the grand total of all the casualties to which the exhibit relates. Do you show the detail of those casualties on sheet No. 2?

A. I have.

Q. Is the showing on sheet No. 2 a correct excerpt of what appears on the individual form T's covering these particular occurrences?

A. It is.

Q. I take it that the calculations are your own calculations on the face of the exhibit?

A. That is correct.

Q. And are capable of check?

A. Yes, sir.

Q. Will you say whether or not the computations on the exhibit are true and correct?

A. They are.

Q. I will ask you if these casualties indicated on exhibit [fol. 3733] No. 283 for identification are those incident to freight train operation in Arizona sustained by employees but in addition to those which are shown on exhibit No. 274?

A. They are in addition, the ones shown on No. 274 only include employees on duty.

Q. And in this exhibit you undertake to show those to employees not on duty but still classed as employees?

A. That is correct?

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 283.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 283.")

[fol. 3734] The Court: Well, these casualties were reported to the Interstate Commerce Commission?

A. They were.

Q. The regulations so require?

A. It requires the reporting of injuries to all persons regardless of their classification or occupation, but it requires by a symbol to indicate on the report whether the employee is on duty or if it is an employee off duty; so I prepared the exhibits on the same basis that is followed by the Interstate Commerce Commission, employees on duty and employees off duty.

The Court: Now, Mr. Sullivan, an employee of the Southern Pacific who was not engaged in any duties for the railroad, he would not be classed or would not be listed under this exhibit here; what I am getting at is, suppose that after working hours he suffers an injury like any other individual might, the company doesn't keep any record of that?

A. If he was injured through the operation of a train, and depending on the circumstances, he would be classified as a trespasser if he had no right to be where he was; he would be classified as a non-trespasser if he had a right to be where he was when struck. If a conductor of the Southern Pacific Company off duty was crossing a street cross-[fol. 3735] ing, where he had a right to be, and was struck by a train, car, or locomotive, the injury would be reported under the rules of the Commission on form T and he would be classified as a non-trespasser; but every injury, every fatality, resulting, must be reported even though the person injured may have been a trespasser.

Mr. Mason: I think what his Honor had in mind was whether all injuries to employees off duty were reported, and I think you made it clear. I will ask you if you have undertaken to show here only those injuries incident to the operation of freight trains on the railroad? You wouldn't report an injury to an employee suffered in an automobile accident far from the right-of-way, would you?

A. No. I might explain by a detail. Item 3, sheet 2 of exhibit 283 shows an injury to Conductor W. W. Pettis. He had just completed his trip, he was off duty and his pay

had stopped, but while crossing over between trains on the way to the office, considering the conditions under which he had to cross, he had a lawful right to be there, and while crossing between the cars his hands slipped and he fell. The rules of the Commission require in cases of that [fol. 3736] kind that the injury be reported as an employee off duty rather than as a trespasser or as a non-trespasser.

Mr. Mason: Has your Honor any further questions?

The Court: No, no further questions.

Mr. Mason: Will you take up next, Mr. Sullivan, a statement in two sheets bearing the title, "Casualties to All Classes of Employes off Duty, Road Freight Train Operation, Sustained in Train and Train Service Accidents, Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, State of Nevada?"

A. I have prepared such an exhibit.

Mr. Mason: May we have this marked as No. 284 for identification.

The Court: It may be marked for identification.

The Clerk: Defendant's Exhibit No. 284 for identification.

Mr. Mason: From what sources was this exhibit prepared, Mr. Sullivan?

A. From the same sources as the preceding exhibits, photostatic copies, certified photostatic copies of form T's for the year 1923 to 1935, inclusive, and true carbon copies of the office copies of the original form T's made by the Company to the Interstate Commerce Commission.

[fol. 3737] Q. Now, does this exhibit relating to Nevada include any accidents reportable to the Interstate Commerce Commission but which for any reasons were not so reported?

A. It does not.

Q. Will you say whether or not the showing on this exhibit is similar in form to that made on Exhibit 283?

A. It is. It is a companion exhibit.

Q. In column J you show a grand total of all casualties. Do you show the details of such casualties on sheet No. 2?

A. Yes.

Q. Are these details a true and correct representation of what is set forth on the form T reports?

A. They are.

Mr. Mason: Have you any questions, Mr. Strouss?
Mr. Strouss: No.
Mr. Mason: Your Honor?
The Court: No.

Mr. Mason: Is the exhibit true and correct in so far as it concerns computations, Mr. Sullivan?
A. It is.

Mr. Mason: We offer the exhibit in evidence as No. 284.
[fol. 3738] Mr. Strouss: Objected to as irrelevant and immaterial.
The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 284.")

Mr. Mason: Mr. Sullivan, will you please take up a statement in a single sheet entitled, "Casualties to persons Carried Under Contract (Livestock Caretakers, Banana Messengers, etc.), Road Freight Trains, Sustained in Train and Train Service Accidents, Reportable to the Interstate Commerce Commission, for the Years 1923 to 1939, Inclusive, Southern Pacific Company in States of Nevada and Arizona." Have you that statement before you?
A. I have.

Mr. Mason: Your Honor, may this be marked No. 285 for identification?
The Court: It may be marked.
The Clerk: Defendant's Exhibit No. 285 for identification.

Mr. Mason: Did you prepare No. 285, Mr. Sullivan?
A. I did.
[fol. 3739] Q. Will you state the sources?
A. The sources are the same as for the preceding exhibits, the photostatic certified copies of the form T reports for the State of Arizona and the State of Nevada for the years 1923 to 1935, inclusive, and true carbon copies of the office copies of the original form T's made by the company to the Interstate Commerce Commission.
Q. Have you examined the counterpart copies of the form T's since and including the year 1936 for any casualties of the type indicated by the exhibit?
A. Yes.

Q. Will you say whether or not there were any casualties of that type in either state since the first of January, 1936, to and including the end of 1939?

A. The only casualties reportable are the ones shown on exhibit 285 for the State of Nevada and the State of Arizona. There have been no accidents of that type in Nevada since 1925 or in Arizona since 1934.

Q. Will you say whether or not the showing upon the exhibit is a true and correct representation of what appears in the original documents to which you have referred?

A. It is.

[fol. 3740] The Court: Do I understand that it is customary for the railroads, for instance, with a livestock shipper to permit him to send one man along to care for the cattle and that you haul him free and return him to his point of embarkment, that is where he left from?

A. That is true; there are one or more caretakers that may travel with the stock, depending upon the number of carloads in the shipment, the number being regulated by rule and tariff; and it is optional with the shipper whether he will have a caretaker or not. Upon his arrival at destination he is returned to his point of origin if he desires to return there.

Q. And this exhibit would cover injuries to such people?

A. It will while on the freight train, and if the livestock caretaker returning after accompanying a shipment of stock is traveling on a passenger train and should be injured, he would be classified as a passenger and not as a person traveling under contract.

Q. He is really a non-revenue passenger?

A. That is right.

Mr. Mason: There was even some dispute as to that, your Honor, because perhaps the money for his transporta-
[fol. 3741] tion is part of the money for the transportation of the livestock.

Q. Now, Mr. Sullivan, I take it that exhibit 285 for identification relates to only those casualties which may have been suffered by persons such as livestock caretakers while riding on freight trains within these two states?

A. That is correct.

Q. Is the classification shown in the title "Persons Carried Under Contract" a classification employed by the

Interstate Commerce Commission in its rules relating to the reporting of railway accidents?

A. It is.

Q. Do they prescribe therein which classes or subclasses of persons shall be regarded as carried under contract?

A. Yes, all persons who have a legal right to be on the train, but who are not employees, are classified by the Interstate Commerce Commission as persons carried under contract. That applies not only to freight trains, but to certain classes of individuals who travel on passenger trains.

Q. As applied to freight trains, who are the principal classes of persons carried under contract?

A. Livestock caretakers, banana messengers, attendants [fol. 3742] in charge of emigrant movables.

Q. Messengers in charge of live poultry cars?

A. Messengers in charge of live poultry; in some cases representatives of fruit-growing associations, who are permitted to ride to accompany test shipments of perishable freight, well, depending upon conditions. The field is somewhat large.

Mr. Booth: Mr. Sullivan, a trainman's term for a caretaker in charge of emigrant moveables is "Zulu," isn't it?

A. I think that is the term generally used.

Mr. Mason: Any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 285.

Mr. Strouss: I object to the part relating to Nevada as irrelevant and immaterial.

The Court: The objection will be overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 285.")

Mr. Mason: Mr. Sullivan, in connection with persons [fol. 3743] carried under contract on freight trains, what is the extent, the minimum extent of the disability which renders an accident reportable?

A. Any disability beyond one day.

Q. Do the rules require the reporting of all accidents even though not necessarily directly connected with the operation of the train?

A. Yes, if the injury is sustained in connection with the operation of the train.

Q. I notice here you have one accident in the State of Arizona, item No. 4, where a livestock caretaker was kicked by a steer while inside of the car?

A. Well, that is reportable under the rules, the accident occurred while the individual was on the freight train.

The Court: If the steer had kicked him while loading him, you wouldn't have reported it?

A. If it was on the company premises, that would be reported as a non-train accident to a non-trespasser.

Mr. Mason: Mr. Sullivan, I will ask you to take up next, if you will, please, a statement in one sheet bearing the title "Derailments Caused by Defects in or Failures of Freight Car Equipment, Road Freight Trains, Including [fol. 3744] Mixed, Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, State of Arizona." Is that before you?

A. Yes, sir.

Mr. Mason: May we have the statement marked Defendant's Exhibit No. 286 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 286 for identification.

[fol. 3745] Mr. Mason:

Q. Did you prepare this exhibit or cause it to be prepared?

A. I prepared the exhibit.

Q. I take it as to columns A, B, and C the sources are as previously explained by you?

A. That is correct.

Q. From what sources did you draw the information in columns D and E?

A. From the form T reports, the same sources as the reports that casualties are made to the Interstate Commerce Commission.

Q. Do the form T reports show in connection with the

accidents causing damage to equipment the amount of the damage to equipment?

A. It does.

Q. I will ask you whether or not the accidents shown here are largely or entirely of the class known as "train accidents"?

A. They are the train accidents, that type of accident involving damage to equipment, track, and structures, including the cost of clearing wrecks exceeding $150 for each accident.

Q. Here I take it you have included only that particular class of train accidents which may be referred to as "derailments"?

A. That is right, that is one of the primary classifications [fol. 3746] by the Interstate Commerce Commission.

Q. Does your form T report show again whether a derailment is due to a defect in or failure of equipment as contrasted with defect in or failure of the roadbed or track structures?

A. Item 17 and item 26 on form T require that a narrative description of the cause be given and the Interstate Commerce Commission Class No. 8 indicates also that it is due to a certain cause, different symbols being required for derailments due to defects or failures of equipment or from other causes.

Q. I take it this is confined not only to a particular class of train accident known as "derailment" but to those which are caused by defect in or failure of equipment?

A. Freight car equipment, yes.

Q. This does not include any defect in or failure of the locomotive?

A. It does not.

Q. Or of the track?

A. It does not.

Q. Or any derailment which may have been due to failure or negligence of employees?

A. Not as classified by the Interstate Commerce Com- [fol. 3747] mission, but negligence could be involved but nevertheless it is classified by the Interstate Commerce Commission as a defect or failure of the equipment.

Q. When I speak of negligence of employees, if there were a derailment due to excessive speed or failure to close a derail, that wouldn't be shown here?

A. It would not.

The Court: Does some part of the train actually have to leave the rails to constitute a derailment?

A. Yes, sir.

Q. Even if only one car on the train was derailed, it would constitute a derailment?

A. That is correct, or if even one wheel of the car was derailed that would classify it as a derailment.

Q. This exhibit merely purports to show those derailments which were caused by defective freight car equipment?

A. Or failure of some part of the equipment which might not have been defective, that is correct.

Mr. Mason:

Q. Mr. Sullivan, I notice in the title beside the words, [fol. 3748] "Description or Nature of Defect or Failure," you have also the words, "And I. C. C. Cause Code Numbers." You explained yesterday the system of code number used by the Interstate Commerce Commission in its accident bulletins relating to particular classes of train-service accidents. Does the Commission use code numbers with relation to the causes and classification of causes of train accidents as well?

A. It does.

Q. Are you using those same numbers here for the purposes of this exhibit?

A. I have. I have shown the code causes so that in case anyone desired to analyze the exhibit they could determine what kind of defect is reportable under the various heads.

Q. Referring to column D and to line 3, how do you arrive at the figure in column D?

A. I tabulated the number of accidents classified as derailments involving freight car equipment that occurred in the state of Arizona for the year 1925. The aggregate of that particular class was nine and opposite was shown the total damage in those nine accidents.

Q. This particularly refers to failures of trucks. Did you add up the number of truck failures to get the nine? [fol. 3749] A. Yes, and the related causes, trucks and arch-bars and parts of the trucks and arch-bars.

Q. How did you get the figure in column E, line 3, is that by addition of the separate figures appearing on the several form T reports?

A. That is correct.

Q. Corresponding to the nine numbers?

A. That is right.

Q. Did you follow the same process as to the figures in each column and in each line other than those which appear to be totaled?

A. I did.

Q. Going over to columns R and S, are those the addition of what appears in the preceding columns?

A. It is.

Q. The computations in column T and U, are those simply rates?

A. They are calculated rates, in relating the total number of accidents shown in column R against the freight train miles shown in column B for the result shown in column T and against the freight train car-miles in column C for the rate that is shown in column U.

The Court: Mr. Sullivan, it appears from this exhibit [fol. 3750] there are 105 accidents or derailments, I take it, caused by the defects or failures in equipment. Does it necessarily follow there were any casualties in connection with these derailments?

A. The footnote will indicate the only reportable casualties by an index figure, the letter "(a)" in column D on line 3 indicates that in one of those accidents an engineer was killed; on line 5 in column L, one accident in which a telegraph lineman was killed. There were no other casualties in those 105 reportable derailments.

Mr. Mason:

Q. The only casualties were these two fatalities and there were no personal injuries involved in these derailments?

A. That is correct.

Q. Will you say whether or not the exhibit is true and correct as reflecting the underlying sources?

A. It is.

Q. Have the computations been checked?

A. They have.

Q. Are they true and correct?

A. They are.

Q. One other question as to the face of the exhibit, you show in line 22 certain rates, are those the calculations of [fol. 3751] the number of accidents for the entire period

related to the total number of car-miles for the entire period?

A. They are.

Q. And are capable of check against the figures in line 21?

A. They are. The accident rate based on one hundred million car-miles figured on car-miles because the defect in every case is associated with an individual car rather than the train.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 286.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 286.")

Mr. Mason:

Q. Will you please refer to a statement in a single sheet bearing a title similar to that on exhibit No. 286 but relating to the state of Nevada. Have you that exhibit before you?

A. I have.

Mr. Mason: May this statement be marked as "Defend-
[fol. 3752] ant's Exhibit No. 287"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 287 for identification.

Mr. Mason:

Q. Will you state whether this exhibit was prepared in the same manner and along the same lines as exhibit No. 286?

A. Exactly in the same manner as the preceding exhibit.

Q. And the rates have been calculated and are placed in corresponding lines and columns, have they?

A. They have. There is a difference; I want to call attention to the block at the foot of the exhibit that does not appear on the exhibit No. 286.

Q. I was going to ask you about that. Have you undertaken by the block bearing the identification, "Summary of Derailments Shown Above," to classify the accidents by

the type or character and the portion of the equipment which failed and by train length as between 70 cars and less and over 70 cars?

A. I have.

Q. Has the exhibit been compared against the underlying sources?

[fol. 3753] A. It has.

Q. Have the computations been checked?

A. They have.

Q. Will you say whether or not it is true and correct?

A. It is.

Q. Do I understand that you are likewise showing here the casualties by way of death or injury which may have been incurred by employees in connection with these derailments?

A. I have, by reference to line 16 in column F an index letter "(a)" is shown which indicates that one of the trainmen was injured in one of the accidents shown.

Q. You also show a reference in 1934, line 13, to "(b)"?

A. That indicates that in that accident two trainmen were injured.

Q. I will ask you whether these casualties shown on exhibit No. 286 just received and also on No. 287 for identification are included in the lists of personal injuries to train and enginemen in the states of Nevada and Arizona which have been received as exhibits Nos. 274 and 275?

A. I will have to check, but my recollection is that the engineer who was killed was not on a road freight train [fol. 3754] but was on another train and was killed when the derailment occurred.

Mr. Mason: Have you any questions on exhibit No. 287, Mr. Strouss?

Mr. Strouss: This also includes cost of clearing wrecks, does it, Mr. Sullivan?

A. It does, yes. I didn't complete my answer. On item (b) the telegraph lineman killed is shown as item 190 on sheet No. 5 of exhibit No. 274. I have a footnote, Mr. Strouss, at the bottom of exhibit No. 286 which indicates what is included in the term "damage." Damage includes "damage to equipment, track and structures, and cost of clearing wrecks."

Mr. Strouss: But it would only include cost of clearing wrecks where the wreck was caused by derailment as a result of defect or failure in freight car equipment?

A. Yes, only the accidents that are included in this particular exhibit.

Mr. Mason: We offer exhibit No. 287 in evidence.

Mr. Strouss: Same objection.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and [fol. 3755] marked "Defendant's Exhibit No. 287.")

Mr. Mason:

Q. Mr. Sullivan, I will ask you to refer, if you will, to sheet No. 6 of exhibit No. 275 and to item 218. Is that the same accident which is referred to by your footnote "(a)" on your exhibit No. 287?

A. Yes, that is the one.

Q. Will you refer to item 224 on sheet No. 6 of exhibit No. 275. Is that the same accident which is referred to in footnote "(b)" on exhibit No. 287?

A. That is the accident.

Q. Have you before you a statement in one sheet entitled "Comparison of the Total Derailments Caused by Defects in or Failure of Freight Car Equipment Shown in Exhibit No. — for State of Nevada, and Exhibit No. — for State of Arizona, Years 1923 to 1939, Inclusive"?

A. I have.

Q. I take it that these blanks should be filled in by reference to preceding exhibits. Will you indicate the numbers?

A. The first blank on the second line of the title should show exhibit No. 287 for the state of Nevada and exhibit No. 286 for the state of Arizona.

[fol. 3756] Mr. Mason: May we have the statement just referred to marked for identification as "Exhibit No. 288"?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 288 for identification.

Mr. Mason:

Q. Will you say whether exhibit No. 288 is a compilation of the information appearing on the last two exhibits, Nos. 286 and 287?

A. It is. The block at the foot of the exhibit indicates where the figures in the various columns have been obtained.

Q. I take it this is simply a gathering together in one

place of the information shown in separate columns on the preceding exhibits?

A. That is correct.

Q. Are there any additional computations on this exhibit?

A. Yes.

Q. Will you indicate in which columns they appear?

A. In columns L and M and P and Q the total damage on account of the derailment shown on the exhibits referred to has been related to a million train mile basis and one hundred million car mile basis, respectively, so that the com-
[fol. 3757] plete showing will show in corresponding columns the accident rate and the damage per accident rate on a train mile and on a car-mile basis.

Q. In line 7 you show certain averages under the rate columns, J to M and N to Q, inclusive. Are those averages of the total money, total train-miles, and total car-miles over the period?

A. They are.

Q. So that this is not an average of averages but an actual over-all average rate?

A. It is an actual over-all average rate.

Q. Would the same be true as to lines 14 and 20?

A. Exactly.

Q. And line 21?

A. Yes, sir.

Q. Have these computations been checked?

A. They have.

Q. Will you say whether or not the exhibit is true and correct insofar as it reflects the underlying sources or the computations to which you have referred?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

[fol. 3758] Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 288.

Mr. Strouss: The same objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 288.")

Mr. Mason:

Q. Mr. Sullivan, I will ask you to take up a statement in twelve sheets entitled, "Detail of Train Accidents, Road

Freight Train Operation Reported to the Interstate Commerce Commission, Years 1923 to 1935, Inclusive, State of Arizona."

A. I would like to request that that title be corrected, where it shows the years "1923 to 1935" it should be "1923 to 1939."

Mr. Mason: May we have the title read in the last line, "Years 1923 to 1939, Inclusive"?

The Court: It may be corrected.

Mr. Mason: May we have this statement marked for identification as "Defendant's Exhibit No. 289"?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 289 for identification.

Mr. Mason:

Q. Mr. Sullivan, did you prepare this exhibit?

A. I assisted in its preparation and checked the entire [fol. 3759] exhibit.

Q. Was it prepared under your direction and supervision?

A. It was.

Q. From what sources?

A. From the four T reports, the same sources as the preceding exhibits.

Q. Was this exhibit prepared in the same manner as exhibit No. 274?

A. It has gone further than No. 274. This is a detail of all train accidents and No. 274 includes some injuries that are included in No. 289 for identification.

Q. I understand that, but my question was, was it prepared in the same manner as exhibit No. 274?

A. Yes.

Q. I understand that the difference between the two exhibits is that exhibit No. 289 for identification relates to train accidents in road freight train operation whereas exhibit No. 274 relates to casualties to employees on duty sustained in either train or train-service accidents?

A. That is correct.

Q. Would it follow then, Mr. Sullivan, there is some duplication as between the exhibits?

A. As to the personal injuries, yes.

[fol. 3760] Q. Where there were personal injuries involved in train accidents, that accident will be shown in exhibit No. 274, will it?

A. If it was an employee on duty.

Q. And would, of course, also be shown in exhibit No. 289 if that exhibit is correct?

A. That is true.

The Court: But there might be a train accident reported on this exhibit No. 289 without any resulting casualty?

A. That is correct. In fact practically all of them are of that type.

Mr. Mason:

Q. Will the accidents shown on exhibit No. 289 for identification, if they were derailments resulting from defects in or failures of car equipment, be included in the showing on exhibits Nos. 286 and 288?

A. They will.

Q. I take it this is simply a presentation of the train accidents by detail and in sequence?

A. For road freight train operation, that is correct.

Q. Will you say whether or not the information shown hereon corresponds to that which appears on the original sources, the form T reports to which you referred?

[fol. 3761] A. It does.

Q. Has the exhibit been carefully checked for that purpose?

A. It has.

Q. Are there any computations or calculations of your own in connection with the exhibit?

A. No.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 289.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 289.")

The Court: For an accident to have been reported and to appear on this exhibit No. 289, there must have been damage in excess of $150?

A. That is correct.

Mr. Mason:

Q. Do you undertake by this exhibit to show all reportable train accidents whether accompanied by casualties or not which occurred in road freight train operation during the [fol. 3762] period referred to?

A. I have, that is correct. That includes derailments, collisions, locomotive accidents, and miscellaneous train accidents.

Q. Have you any other comment on the exhibit, Mr. Sullivan?

A. No.

Q. Will you take up a statement in nine sheets bearing the title, "Detail of Train Accidents, Road Freight Train Operation, Reported to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, State of Nevada"?

A. I have the exhibit.

Mr. Mason: May we have this statement marked "Defendant's Exhibit No. 290" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 290 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 290, Mr. Sullivan?

A. I did.

Q. From the form T reports or the certified copies thereof or retained copies thereof as you have previously mentioned?

A. Yes, sir.

Q. Will you say whether or not this exhibit No. 290 cor- [fol. 3763] responds to exhibit No. 289 except that it relates to the state of Nevada?

A. It does.

Q. Is it a true and correct representation of the information appearing upon the underlying documents?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions on the exhibit?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 290.

Mr. Strouss: The same objection as to the previous exhibits on the state of Nevada.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 290.")

Mr. Mason: May we take our recess at this time, your Honor?

The Court: Yes, we will take our recess now.

(Thereupon a short recess was taken after which proceedings were resumed as follows.)

[fol. 3764] The Court: You may proceed.

Mr. Mason: Mr. Sullivan, I will ask you to refer, please, to a statement in four sheets entitled "Casualties to All Classes of Persons, Except Trespassers, Sustained in Train and Train Service Accidents While On, Employed On, or Getting On or Off Passenger Trains, Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive; Southern Pacific Company Lines in State of Nevada." Have you that statement before you?

A. I have.

Mr. Mason: May we have the statement marked Exhibit No. 291 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 291 for identification.

Mr. Mason: Mr. Sullivan, as I look at the exhibit, the first sheet is a summary sheet of details which are shown on the succeeding sheets, is that correct?

A. That is correct.

Q. And the first sheet also contains certain calculations predicated upon the statistics which appear on the first sheet, is that right?

A. That is correct.

[fol. 3765] Q. Now, will you state from what sources you obtained the figures shown in columns B, C, and D?

A. The basic figures in column B represented the number of revenue passengers carried, column C, revenue passengers one mile in thousands, and passenger train-miles in thousands were abstracted from the annual report of the

Southern Pacific Company to the Nevada Public Service Commission.

Q. Are those directly copies from those annual reports for those several years which are referred to on the exhibit?

A. Yes, sir.

Q. Now, I take it that the figures shown in columns E to P inclusive, are the aggregation of the figures representing the individual accidents shown on the succeeding sheets?

A. That is correct.

Q. As to columns Q and R, what are those?

A. They are the total of the preceding columns of the killed and injured, respectively.

Q. Now, in columns S, T, and U, have you calculated the casualty rate for the passengers separately?

A. I have.

Q. And in column V, the casualty rate for employees on the train-mile basis?

[fol. 3766] A. I have.

Q. And in column W, to persons other than passengers or employees classed as non-trespassers.

A. I have.

Q. And finally the casualty rate for all persons in column X?

A. I have.

Q. Are these calculations true and correct?

A. They are.

Q. And are the figures upon which the calculations are predicated likewise true and correct?

A. They are.

Q. Now, going to sheet 2, I will ask you whether the explanation of sheets 2, 3 and 4, is similar? What do you undertake to show on these sheets?

A. They are the details abstracted from the Form T reports of the Southern Pacific to the Interstate Commerce Commission.

Q. And are these a correct summary of the details as they appear upon the form T reports?

A. They are.

Q. Are there any of the accidents which are referred to on Exhibit No. 291 for identification which were reportable but not reported?

A. No.

[fol. 3767] Q. Did you make an examination to determine whether there were any accidents involving passenger trains that might not have been reported although reportable?

A. I made such an investigation, and found none.

The Court: I see one of these accidents was caused by a dog biting the baggageman.

Mr. Mason: Mr. Sullivan, is an accident of that kind nevertheless reportable, if it occurs during the operation of the passenger train?

A. Yes, it is reportable.

Mr. Mason: Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Your Honor? We offer the exhibit in evidence as Exhibit No. 291.

Mr. Strouss: The same objection.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 291.")

Mr. Mason: Now, Mr. Sullivan, is there any detail of the operation or any detail of the showing, rather, as it relates to the year 1939 which deserves particular mention other [fol. 3768] than mention which has been made on the exhibit

A. Yes. I would like to invite attention to sheet 4, item 51, wherein reference is made to a derailment of No. 101, which is a streamliner consisting of fourteen cars, in which a number of passengers and employees were killed and injured, which was due to malicious tampering with the track, and has a tendency to otherwise distort a statistical showing of this kind, which is readily apparent when reference is made to the casualty rates for the year 1939 as well as the five-year period shown on line 20 for the years 1935 to 1939.

The Court: Were the parties responsible for this ever apprehended and prosecuted?

A. No, sir.

Mr. Mason: Do you know and, if so, will you state, Mr. Sullivan, whether efforts are still being continued to run

down the person or persons responsible for the Harney wreck?

A. Yes, I know of my own knowledge that such effort is being made.

Q. Is there a substantial reward offered by the company for their apprehension?

A. Yes, sir.

Q. Do you know how much?

[fol. 3769] A. I don't recall; it seems to me it is $10,000. And I may state that while the cause is given in column 1, train derailment due to malicious tampering with the track, that was an accident investigated by the Bureau of Safety of the Interstate Commerce Commission, and that was the cause assigned by that body for the accident.

Q. You have reference now to the report of the investigation as published by the Interstate Commerce Commission?

A. Yes.

Q. Bureau of Safety?

A. And I have that report in a separate bound copy in my office across the street.

Q. Mr. Sullivan, you were assistant superintendent on the lines in Nevada for several years, were you not?

A. I was.

Q. You were inspector of transportation in the territory including the lines in Nevada for some time, too, were you not?

A. For a short time in 1920.

Q. Now, I would like to have you refer, if you will, please, to sheets 3 and 4 of your exhibit. I noticed that on sheet three, for example, the first item, No. 23, you refer to train [fol. 3770] No. 28. Do you remember the name designation of train No. 28?

A. The Overland Limited.

Q. And what is the name designation of train No. 21?

A. The Pacific Limited.

Q. Of train No. 9?

A. Fast Mail.

Q. Of No. 22 when that is shown in 1932?

A. I don't recall the designation, it seems to me that was known as the Reno Local.

Q. Now, going to sheet 4, you show a train designation there of No. 14.

A. Pacific Limited.

Q. No. 30, was that the Challenger or Advance Overland Limited?

A. I don't believe it had a designation, but it was operated as an advance overland limited, later changed to 88.

Q. Is No. 27 a companion to No. 28?

A. It is.

Q. You show also 87.

A. That is the Challenger.

Q. And finally 101, the train which was derailed at Harney?

A. That is known as the Streamliner City of San Francisco, a Diesel-operated train.

[fol. 3771] Q. Mr. Sullivan, during your experience as assistant superintendent on the Salt Lake division, will you say whether or not the operation of passenger trains of more than 14 cars was usual or unusual?

A. It was a common practice.

Q. Have you before you, Mr. Sullivan, a statement in ten sheets bearing the title on the first sheet, "Casualties to all Classes of Persons Except Trespassers Sustained in Train and Train Service Accidents While on, Employed on or Getting on or off Passenger Trains, Reportable to the Interstate Commerce Commission, Years 1923 to 1939, Inclusive, Southern Pacific Company Lines, State of Arizona."

A. I have that exhibit before me.

Mr. Mason: May we have the exhibit marked as No. 292 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 292 for identification.

Mr. Mason: Did you prepare Exhibit 292, Mr. Sullivan?

A. I did.

Q. I take it, the sources are as shown in the footnotes on Sheet No. 1?

A. That is correct.

[fol. 3772] Q. Did you make the calculations of the rates indicated in columns S to X, inclusive?

A. I did.

Q. Will you state whether or not this exhibit has been prepared along the same lines and in substantially the

same form as to sheets 1 and 3 to 10, inclusive, as exhibit 291?

A. It has.

Q. Now, going to sheet No. 2—before we do that we will go to sheet No. 3. What do you undertake to show on sheets 3 to 10 inclusive?

A. Show a brief narrative, showing the date of the occurrence, the location, and other information that is shown on the carrier's form T of all accidents and personal injuries sustained by persons other than trespassers while on, employed on, or getting on or off pasenger trains in the state of Arizona.

Q. I take it, then, that sheets 3 to 10, inclusive, are a summary of the details of each of these accidents as such details appear in the form T reports?

A. That is correct.

Q. And you have simply shown them here in chronological order?

A. That is correct.

[fol. 3773] Q. By the way, I want to call your attention, Mr. Sullivan, to sheet 8. Will you refer to that sheet, and particularly to item 156. I take it that that accident is the one to be compared to the one where the person was bitten by a dog?

A. I think that is the one.

Q. Now, will you refer to sheet 2, Mr. Sullivan and explain what you have undertaken to do on that sheet?

A. As will be noted from Exhibit No. 291, casualty rates have been calculated relating to passengers, to employees, and to other passengers, and similar calculations on exactly the same basis on Exhibit 292 cover similar information for the State of Arizona. I have then on sheet 2 of Exhibit 292 made a comparison of the casualty rates for the same cycles of years, six years, 1923 to 1928, six years, 1929-1934, and five years, 1935 to 1939, as well as for the entire seventeen-year period, Arizona with Nevada, and then I have pointed out following an index reading "Ratio, Arizona Rates to Nevada Rates," to show the relationship of those rates to each other. In every case the casualty rate for all classes and for all periods is higher in Arizona than in Nevada except——

[fol. 3774] Mr. Strouss: Just a minute——

Mr. Mason: I don't think you should testify as to what the exhibit shows. You have made these computations, and

the computations, I take it, are explained by the wording on the face of the exhibit.

Q. Now, have you taken into account in the computations for the third block representing the period 1935 to 1939, inclusive, the casualties occurring in the Harney derailment?

A. They are included.

Q. Are they included, likewise, in the grand total?

A. They are.

Q. Have these computations been checked against the underlying sources?

A. They have.

Q. Has the exhibit itself been checked against the form T reports or other underlying sources to determine its correctness?

A. It has.

Q. Will you say whether or not it is true and correct?

A. It is.

Mr. Mason: We offer the exhibit in evidence as defendant's Exhibit No. 292.

[fol. 3775] Mr. Strouss: I object to the matter on page 2 relating to operations in Nevada as irrelevant and immaterial.

The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 292.")

Mr. Mason: Now, Mr. Sullivan, I think that prior to the offer of the exhibit and its reception in evidence, you were about to comment upon the relationship between the casualty rates for the various classes of persons stated in Arizona and in Nevada, and the fact that the Arizona rates were higher or lower as the case might be. Will you continue with, or repeat that comment?

A. I called attention to the index identified as "Ratio, Arizona Rates to Nevada Rates," and in two instances "Ratio, Nevada Rates to Arizona Rates," in each of the four blocks; and I would like to invite attention that in every case except four, three of the items being in columns R, S, and T, in item No. 3 for the five years 1935-1939, and in column S, in item 4 for the 17-year period the casualty rate in Arizona is higher for every class than in Nevada,

the relationship one with the other being shown by the ratio [fol. 3776] figure in each column opposite the arrow.

Q. In each instance, as I read the exhibit, Mr. Sullivan, you have shown the ratio of the greater rate to the less rate however it might fall, have you?

A. That is right.

Q. Now, I would like to have you refer, if you will, to item 104 on sheet 6 of this exhibit. Do you know and, if so, will you state whether the accident referred to in item No. 104 was the subject of investigation by the Bureau of Safety of the Interstate Commerce Commission?

A. It was.

Q. And have you in the court room a copy, a printed copy of the published report of the Bureau of Safety?

A. I have.

Q. Will you identify it by its number and date, please?

A. The report appears at page 9 and continues to page 10 of the Interstate Commerce Commission Bureau of Safety Summary of Accident Investigation Reports No. 49, for the months of July, August, and September, 1931, the title page of the report bearing the seal of the Interstate Commerce Commission.

[fol. 3777] Q. This is a report, is it, bearing serial number 49, issued by the government printing office at Washington during the year 1932, according to the title page, is it?

A. That is correct.

Mr. Mason: Your Honor, I had intended to ask the witness to read from the report, but in order to save time and save the reporter, I will ask, with the consent of counsel and with your Honor's authority, that the reporter simply take the report and copy it into the record as if read.

Mr. Strouss: I have no objection to that. I would like to see it.

The Court: You say you have no objection, Mr. Strouss?

Mr. Strouss: No, I have no objection.

The Court: It may be copied in the record.

Mr. Mason: With the same effect as if the witness had read it?

The Court: Yes.

(The Summary of Accident Investigation Report referred to reads as follows:)

"Southern Pacific Co.

"Derailment of a passenger train near Dome, Ariz., on August 5, 1931, which resulted in the death of 2 employees and the injury of 12 passengers and 5 trespassers.

[fol. 3778] "This accident was caused by excessive speed on a sharp curve.

"In the vicinity of the point of accident this was a single-track line over which trains were operated by time-table, train orders, and an automatic block-signal system. The accident occurred near mile post 750 at a point approximately 3 miles west of Dome. Approaching this point from the west, the track was tangent, followed by a short curve to the left, a short tangent, and then a compound curve to the right 1,165 feet in length; this latter curve consisted of 270 feet of spiral, a 10 degree curve 456 feet in length, and then a six-degree curve for a distance of 289 feet, followed by 150 feet of spiral; the accident occurred on the six degree curve at a point 15 feet from its western end. The grade for eastbound trains was slightly ascending, being 0.04 per cent at the point of accident. On account of the rugged and mountainous country and the numerous sharp curves located on this section, the maximum speed for all trains in this vicinity was 30 miles per hour; the slow board at the western end of this restricted territory was located at a point 2.34 miles west of the point of accident.

[fol. 3779] "In the vicinity of the point of accident the track was on a fill 20 feet in height; it was laid with 130-pound rails, 39 feet in length, with 22 or 23 creosoted fir and gum ties to the rail length, fully tie-plated, double-spiked, and ballasted with crushed rock to a depth of 8 inches. The track was maintained in excellent condition.

"It was raining at the time of the accident, which occurred about 2:30 a. m.

"Eastbound passenger train first No. 104 consisted of two baggage cars and one coach, hauled by engine 3122. This train departed from Yuma at 1.55 a. m., according to the train sheet, 15 minutes late, and was approaching Dome when it was derailed while traveling at a speed estimated by a surviving member of the train crew to have been 30 miles per hour.

"Engine 3122 stopped on its left side down an embankment on the outside of the curve, with its head end 200 feet

beyond the initial point of derailment; it was badly damaged, with all the appurtenances torn off from the top as well as the left side of the engine. The tender also stopped on its left side behind the engine. The first car was headed down the embankment; the second car stopped on its right side to the right of the track and the last car stopped, leaning to the right at an angle of 45 degrees against [fol. 3780] the side of the cut. The employees killed were the engineman and fireman.

"The brakeman stated that before reaching the restricted-speed territory the train was traveling at a speed of 60 miles per hour and the conductor estimated the speed at 50 miles per hour. While neither of them was able to state that the brakes had been applied on passing through the restricted-speed territory until just prior to the derailment yet they did not think that the speed was excessive at the time of the accident. A thorough examination of the track and equipment, however, disclosed nothing that could have contributed to the cause of the accident. The only marks found on the track at the point of derailment were on the outside angle-bar bolts on the high rail, and on the ends of the ties leading down the embankment, indicating that the engine turned over from centrifugal force without first being derailed. This could have been accounted for only by excessive speed, which was consistent with the position in which the wreckage came to rest, and with the fact that the engine apparently landed on its back and then turned on its left side before coming to a stop [fol. 3781] down the embankment."

Mr. Strouss: That is not the complete report that was rendered, was it, Mr. Sullivan? This is just a summary of the report that is published here?

A. No, I don't understand that that is a summary report; I understand that that is the official report by the Bureau of Safety.

Q. Did I understand you to say you had a separate report from them?

A. On the Harney derailment.

Mr. Mason: Have you anything further on Exhibit No. 202, Mr. Sullivan?

A. Yes; on account of the reference having been made to the Harney derailment due to malicious tampering with

the track, I thought it only proper to call attention that a similar accident appears in Exhibit 292, that that particular type of accident wasn't associated entirely with Nevada.

Q. Will you state the item and the date sufficiently to identify the accident on Exhibit No. 292?

A. Item 21 on sheet 3 of Exhibit 292.

Q. How many fatalities were there in that?

A. A passenger fireman was killed, and a passenger engineer, and a passenger conductor, and five passengers [fol. 3782] were injured.

Q. Now, is that all that you had on 292, Mr. Sullivan?

A. That was all.

Q. Will you turn now to a statement in a single sheet entitled "Highway Grade Crossing Accidents in Which Automobiles Were involved, All Railroads, State of Arizona; Reflected by Statistics of the Interstate Commerce Commission and Those Which Occurred on Lines of Southern Pacific Company, Years 1923 to 1939, Inclusive?"

A. I have the exhibit.

Mr. Mason: May we have this marked "Defendant's Exhibit No. 293?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 293 for identification.

Mr. Mason: Did you prepare Exhibit No. 293, Mr. Sullivan?

A. I did.

Q. Are the sources indicated on the exhibit?

A. They are.

Q. Now, I notice that for the year 1923, you indicate by a footnote reference that the column B, number of accidents not reported. Was the accident bulletin incomplete in that [fol. 3783] respect for the year 1923?

A. Yes, the accident bulletin didn't show until 1924 the number of accidents.

Q. Did it show the number of casualties?

A. It did.

Q. And also the number of automobiles registered by states?

A. It did.

Q. Now, these calculations "casualties for state per 10,000 automobiles registered." were they made by yourself?

A. No, the information shown in columns G and H also appear in the accident bulletins.

Q. And in column I?

A. It is a calculation by myself.

Q. Simply an addition?

A. That is right.

Q. Column J, where is that taken from?

A. Taken from the same bulletin, Summary No. 24.

Q. Now, for the lines identified as Southern Pacific only or "S. P. Only," from what source did you obtain that?

A. From the form T reports of the Southern Pacific Company to the Interstate Commerce Commission.

[fol. 3784] Q. And this, as to the Southern Pacific, is an aggregation of the information appearing on the form T reports for the several years?

A. That is correct, just a tabulation of the number of casualties occurring.

Q. I notice that for the year 1939, you have only the showing for the Southern Pacific. Is that explained at the foot of the sheet?

A. Yes, the I. C. C. accident bulletin for the year 1939 has not yet been made available.

Q. Has the exhibit been checked against the underlying sources to determine its correctness?

A. It has.

Q. Will you say whether or not it is true and correct?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Your Honor?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit 293.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 293.")

[fol. 3785] Mr. Mason:

Q. Mr. Sullivan, have you a statement in a single sheet entitled, "Detail of Casualties to All Classes of Persons, Except Trespassers, Operation of Passenger Trains, South-

ern Pacific Company, State of Arizona, March and April, 1940"?

A. I have.

Mr. Mason: May this exhibit be marked No. 294 for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 294 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 294?

A. I did.

Q. Will you state the sources from which it was prepared?

A. It was prepared from the carbon copies of the original form T's made by the Southern Pacific Company to the Interstate Commerce Commission for the months of March and April, 1940.

Q. Why did you select the months of March and April, 1940, for this particular showing?

A. It was during the months of March and April, 1940, that the passenger trains in excess of 14 cars were operated in the state of Arizona.

Q. Is this showing confined so far as the dates are con- [fol. 3786] cerned to the dates between which the operation of passenger trains of more than 14 cars was carried on?

A. No, it is for the entire two months of March and April, 1940.

Q. In point of fact, did the operation of such long passenger trains start before March 16th?

A. I think the information is in evidence, but I don't recall the date. I know that it was during March and April.

Q. In any event, you have included all of the reportable passenger train casualties during the two months?

A. That is correct.

Q. Has the exhibit been compared?

A. It has.

Q. Will you say whether or not it is true and correct as reflecting the form T reports?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 294.

[fol. 3787] The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 294.")

Mr. Mason:

Q. Mr. Sullivan, I notice in item No. 1 you show a casualty to a passenger on consolidated trains Nos. 5 and 43. Have you made any further investigation of the circumstances of that accident?

A. Nothing except what appeared on the form T report and an examination of the train sheet that No. 43 and No. 5 had been consolidated at Dock for movement to Phoenix on account of failure of engine No. 43 due to a broken oil line between the engine and tender on account of striking boulder on track between Olberg and Dock.

Q. Does the form T report indicate which train, whether on No. 5 or on No. 43, the passenger had been or was riding?

A. No, the report indicated that the carrier had no knowledge of the injury which was alleged.

Q. When did the injury or alleged injury first come to the notice of the carrier's employees?

A. I don't know of my own knowledge.

Q. Is it indicated by the form T report?

A. It is not. I simply call attention to item 2 on the same report.

[fol. 3788] Q. Did that take place on one of the consolidated trains?

A. On one of the consolidated trains on the same date where the claim was made that it was due to a sudden stop of the train between Olberg and Dock where train No. 43 struck a boulder.

Q. Was that striking of the boulder the cause of the engine failure?

A. Yes.

The Court: It was not the same woman passenger, though?

A. No, a different woman. I simply drew attention to that because both injuries are claimed or alleged.

Mr. Strouss: What do you mean by "alleged"? Is this what was reported to the Interstate Commerce Commission as actually happening?

A. I can explain because I have personal knowledge of cases of that kind. Frequently, weeks or a month after an occurrence some passenger will report to a representative of the carrier that he has been injured and that is the first information that the carrier has of the accident. The rules of the Commission require that such alleged or claimed injuries be reported.

Mr. Strouss: I think if there is going to be a suspicion [fol. 3789] thrown upon the form T reports here that they should bring in the underlying records.

Mr. Mason: I don't think there is any suspicion thrown on the form T reports. The form T report, as I understand it, and you will correct me if I am not correct, carries a report to the Commission that the passenger alleged the injury?

A. That is correct.

Q. The form T report carries a statement that the passenger alleges or claims the injury?

A. That is correct.

Mr. Strouss: If there was no claim of injury until some weeks after, these underlying records will show it. If that is what they are trying to get in here, by inference, I would like to have the records brought in.

Mr. Mason: We are only emphasizing what the form T reports emphasize, that the passenger has claimed the injury.

Mr. Strouss: I think the form T report itself will speak for itself on that.

Mr. Mason: The form T report is available if you desire to examine it as an underlying document. We haven't made any effort to keep you from examining that.

The Court: Well, counsel having asked for the under- [fol. 3790] lying records, they may be produced and given to him.

Mr. Mason: We are prepared to give him the form T reports. We haven't used the others, and I don't think that we are required to give the others.

The Court: As I understand your testimony, Mr. Sullivan, the reports to the Interstate Commerce Commission classify these injuries to passengers in two different ways, that if the passenger makes an immediate report of the injury to the conductor or some other employee of the car-

rier that is reported in one way and where a report comes in days or weeks later that is reported in a different column?

A. No, it is reported in exactly the same manner on the same form. If the company employees or officers have knowledge of the injury, it is reported as an injury. If the carrier has no knowledge and the passenger simply alleged the injury, the form T report is made and simply states that the person alleged the injury but it is reported in the same manner as if the carrier's employees had knowledge of it. I didn't use any of the underlying data for the preparation of this exhibit. Had I thought I would have been permitted to do so, rather than using the reports to the [fol. 3791] government, I could have examined the files and possibly given more information than is on the exhibit, but I relied solely and wholly on the form T reports.

Mr. Strouss: My objection is not what the form T reports themselves show, but it is trying to get an inference to these reports which I don't think is on the face of the report itself. If there is to be any such inference given, then the reports to the trainmen or claim of the passenger should be produced here to show just what the situation was.

Mr. Mason: Your Honor, if there is any attempt to cast inference against the form T report, it proceeds from the other side, not from us. We have simply called attention to the fact there were two accidents on the same day and on the same train.

Mr. Strouss: But the inference has been left, at least by a suggestion, that this type of claim is not made often until weeks or months afterward by a passenger and by that an inference is made that this may have been one of that type of accident, in some way the passenger is faking or whatever inference they are trying to draw from it. If there is an inference other than what the form T report [fol. 3792] shows, I think the underlying records should be produced.

The Court: That is true, but counsel denies there is any such inference on his part. That is the only place you disagree.

Mr. Mason: We are only showing here what the form T report shows. If Mr. Strouss thinks it would be a better showing, we can eliminate items Nos. 1 and 2 here.

Mr. Booth: When a superintendent puts the word "alleged" in a passenger report, it is a very clear indication that he believes it didn't happen.

Mr. Strouss: I expect in almost every instance from the company's standpoint they think it didn't happen, what the passenger alleges. It is probably not unusual.

Mr. Booth: Well, the conductor may be one of your witnesses later on, and you can ask him.

Mr. Mason: I think the exhibit was received in evidence. Mr. Sullivan has one or two additional exhibits.

Q. Have you before you a statement in one sheet entitled, "Detail of Train and Train Service Accidents, Road Freight Train Operation, Reportable to the Interstate Commerce Commission, Southern Pacific Company in State of Arizona, April, 1940"?

[fol. 3793] A. I have.

Mr. Mason: May we have this statement marked, your Honor, as "Defendant's Exhibit No. 295" for identification?

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 295 for identification.

Mr. Mason:

Q. Did you prepare exhibit No. 295?

A. I did.

Q. From what sources?

A. From the form T reports of the Southern Pacific Company to the Interstate Commerce Commission, that is, carbon copies of the office files.

Q. I take it that the information shown in the lower block of the exhibit was prepared from that which was stated of record by Mr. Fewtrell?

A. That is correct.

Q. Your exhibit shows the month of April, 1940. Why did you select that period?

A. That was the month during which freight trains in excess of 70 cars were operated in the state of Arizona.

Q. The details shown in column K of the exhibit, are those taken directly from the form T's?

A. Yes, that is a brief narrative as it appears on the form T.

[fol. 3794] Q. Does that truly and correctly represent what is shown on the form T reports?

A. It does.

Q. Are the form T reports used in connection with exhibit No. 294, the preceding exhibit, as well as in connection with exhibit No. 295 for identification available for the use of opposing counsel?

A. They are.

Mr. Mason: May the record show, your Honor, that these are hereby tendered to opposing counsel for their examination?

The Court: The record may so show.

Mr. Strouss: Which are these?

Mr. Mason: The form T's used in connection with these exhibits Nos. 294 and 295. Have you any questions on the exhibit, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor?

The Court: No.

Mr. Mason: We offer the exhibit in evidence.

Mr. Strouss: No objection.

The Court: It may be received.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 295.")

Mr. Mason:

Q. Mr. Sullivan, as to item No. 5 of this exhibit, you show [fol. 3795] the number of cars in the train as 91. Does the form T report show that the train was moving with 91 cars in it at the time of the accident?

A. No, it shows it was not moving. It shows that the accident occurred while the caboose was being handled by the engine, as indicated in column K.

Q. Then the speed of eight miles per hour indicated in column F is the speed of the engine and caboose?

A. That is it.

Q. Are there any other comments on the exhibit, Mr. Sullivan?

A. The calculations can be readily made from the basic figures shown in the lower block. It will show that 37,257 train-miles and 3,180,278 freight train car-miles were operated in Arizona in April, 1940, without a reportable casualty on the trains consisting of more than 70 cars. Calculations can also be made relating to train accidents against the train-miles and car-miles. While a month only shows

a small number of accidents, it will be noted that a miscellaneous train accident, a collision, a locomotive accident, and four train-service accidents occurred during the month [fol. 3796] which related to previous exhibits which have been introduced for a year would indicate that it follows the trend, as the same type of accidents may be found throughout the year. The collision, as shown in item No. 7, involved a light engine and a 58-car freight train. I have no further comments to make on the exhibit.

Mr. Masqn: I think that is all for Mr. Sullivan at this time.

Mr. Booth: I would like to call another witness, your Honor?

The Court: You may step aside, Mr. Sullivan.

(Witness temporarily excused.)

E. C. Bruns was called as a witness in behalf of the defendant and being first duly sworn testified as follows:

Direct examination.

By Mr. Booth:

Q. Will you state your name and residence to the reporter, please?

A. E. C. Bruns, 250 25th Street, San Bernardino, California.

Q. What position do you hold with the Atchison, Topeka and Santa Fe Railway Company?

[fol. 3797] A. Claim adjuster.

Q. How long have you occupied that position?

A. Two periods, this last time since 1927. A former period from 1914 to 1916.

Q. Between 1916 and 1927, what was your occupation?

A. I worked in the Los Angeles office from 1916 until 1927 as senior personal injury clerk in charge of the records.

Q. Are you familiar with the system of reporting accidents as required by the Interstate Commerce Commission?

A. I am.

Q. And with the form T reports and other reports required by them in connection therewith?

A. Yes, sir.

Q. Has the Atchison, Topeka, and Santa Fe Railway Company regularly maintained since prior to 1923 office files containing the office copies of the reports filed by it with the Interstate Commerce Commission pursuant to the rules for reporting accidents as amended in 1921?

A. It has.

Q. Have you prepared an exhibit consisting of one sheet and headed, "Atchison, Topeka and Santa Fe Railway Company, Casualties to Road Freight Trainmen and En-[fol. 3798] ginemen on Duty While on or Getting on or Off Road Freight Trains (Through, Local and Mixed), Main Line Territory between Clovis, New Mexico, and Gallup, New Mexico, Compared with Main Line Territory between Gallup, New Mexico, and Needles, California, as Reported to the Interstate Commerce Commission—Years 1923 to 1939, Inclusive"?

A. I have.

Mr. Booth: We ask that this be marked for identification as "Defendant's Exhibit No. 296."

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 296 for identification.

Mr. Booth:

Q. I will ask you whether the figures in columns B, C, D, and E were taken from defendant's exhibit No. 140 introduced in evidence during the testimony of Mr. R. H. Weeks?

A. They are the same.

Q. Are the figures in columns X and Y computations made by you from those figures?

A. Yes, sir, they are.

Q. Made in what manner?

A. By dividing the freight train miles into freight car miles.

Q. Are the figures of averages in columns X and Y, lines [fol. 3799] 7, 14, and 20, averages of averages or are they averages of the added freight train miles and freight car miles for the respective periods?

A. They are the average of the grand-total of the seventeen years, not average of average.

The Court: That average of average might be quite misleading, might it not?

A. It might.

Mr. Booth: That is, the averages in line 7 are obtained by dividing the respective totals in line 7 into those shown in columns B, C, D, and E?

A: That is correct.

Q. And the same is true in line 14?

A. Line 14, 20, and 21.

Q. From what source were the figures in columns F to M, inclusive, taken?

A. F to M, inclusive, were obtained from the file copies of our form T reports as made to the Interstate Commerce Commission.

Q. Have you those file copies here in Tucson with you?

A. I have, yes, sir.

Q. Are they in the temporary office of defendant counsel at 90 Church Street, across the street from the courthouse here?

[fol. 3800] A. They are, yes, sir.

Q. Are they available for the examination of plaintiff's counsel?

A. They are.

Q. Are the figures in lines N, O, P, and Q additions made by yourself?

A. Yes, sir.

Q. Are they true and correct?

A. They are true and correct.

Q. Are the figures in R and S figures made by yourself?

A. Yes, sir, they are grand totals of the previous totals.

Q. Are the figures in columns T, U, V, and W made by yourself?

A. They are.

Q. They are capable of mathematical check on the face of the exhibit?

A. Yes, sir, they are just computations, divisions of casualties into train-miles and freight car-miles.

Q. Are all the figures shown on the face of this exhibit other than those testified to by Mr. Weeks true and correct to the best of your knowledge and belief?

A. They are.

[fol. 3801] Q. As to the detail of fatalities shown in the two blocks at the bottom of the page, one headed, "Clovis, New Mexico, to Gallup, New Mexico," and the other, "Gallup, New Mexico, to Needles, California," from what sources are those details taken?

A. Those details were taken from the form T's covering those particular accidents.

Q. They are not your conclusions but what are stated in the form T reports?

A. An abbreviated statement of what is contained on the form T in each instance.

Q. Are the distances between stations correctly stated in the four lines underneath the statement headed, "Main Line Mileage"?

A. They are.

Q. What is Clovis, New Mexico, in your operations, a freight terminal?

A. Yes, sir.

Q. Where crews change?

A. Yes, it is a freight terminal the same as Tucson is on your line here.

Q. What is Gallup, New Mexico?

A. That is a similar freight terminal.

Q. Is there an intermediate terminal between Clovis and Gallup?

[fol. 3802] A. There are two of them, one at Vaughn, New Mexico, and one at Belen, New Mexico, so that this area from Clovis to Belen covers three so-called "freight train districts."

Q. What is the situation between Gallup and Needles? Is Needles a freight terminal?

A. It is, and that area from Gallup to Needles comprises three freight train districts, Gallup to Winslow, Arizona; Winslow to Seligman; and Seligman to Needles.

Mr. Booth: Any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Booth: Your Honor, the Santa Fe line has been fully described, we think, by the Santa Fe witnesses, Mr. Mahoney, Mr. McDonald, Mr. Thomas and Mr. Blanchard, and we offer this exhibit in evidence.

Mr. Strouss: The same objections as heretofore made to exhibits from foreign roads.

The Court: The objections are overruled, it may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 296.")

Mr. Booth:

Q. In line 22, stating "Period 1935-1939 Compared with Period 1923-1928," opposite the word "Improvement," there is Clovis to Gallup freight train miles per casualty, [fol. 3803] column T, 94.65 per cent. Is that intended to represent the ratio of improvement between the two periods stated?

A. It is.

Q. And the same is true as to line U, Gallup to Needles, 88.03 per cent?

A. That is correct.

Q. All of those figures opposite the two words "Improvement" in columns T, U, V, and W are ratios, are they not?

A. That is right. They are ratios of improvement, one block of years as compared with the other, as stated.

Q. The frequency of casualties is shown on this exhibit by the number of freight train miles per casualty and the number of freight car miles per casualty, respectively?

A. That is correct.

Q. The figure of 97,946, being the first figure in column T, is arrived at by what method?

A. It is arrived at by dividing the total number of casualties for that year, 1923, into the freight train miles.

Q. In other words, it is arrived at by dividing the top figure in column R, 12, into the top figure in column B, 1,175,346?

A. That is correct.

[fol. 3804] Q. And the same is true of all the others?

A. The procedure is the same in all columns.

Mr. Booth: I think I tendered the use of these form T's to counsel, if not they are in the office here.

Mr. Strouss: Someone will be here during next week?

Mr. Booth: Yes.

Q. Now, going to the detail of fatalities. You show only the fatal accidents reported. You have no detail of any others on this exhibit?

A. No, just the fatal accidents are detailed.

Q. Between Clovis, New Mexico, and Gallup, New Mexico, according to this, the only fatalities on trains of over 70 cars in length were "a brakeman murdered by hobos

on 84-car train" and "an engineer and fireman killed on a 99-car train by a locomotive boiler explosion"?

A. That is all in trains of over 70 cars.

[fol. 3805] Q. That was a rather severe derailment, May 16, 1937, where 35 cars were derailed by striking a bull on a bridge. Do you know whether the owner of the bull presented a claim for that?

A. Not to my knowledge.

Mr. Strouss: Rather an odd place for the bull to be, on the bridge?

Mr. Booth: Are there any comments you desire to make on this exhibit?

A. I think they are pretty well explained, they explain themselves, the figures, I don't think there is any particular comment.

Q. Yes, there are one or two questions I want to ask you. Suppose a freight brakeman is getting off of a freight train for the purpose of throwing a switch, and he has let go of the handholds, he is on the ground but he has not recovered his balance yet, and he falls. Although he is not touching any part of the train, is that considered a getting-off casualty?

A. Yes, they are so calculated.

Q. Suppose a trainman is walking or running toward a train to board the train after leaving it for some purpose, is that included?

A. If he was running in an attempt to get on the train, it would be included, and was included.

[fol. 3806] The Court: I take it, Mr. Bruns, from this exhibit, that in the territory between Gallup and Needles, as shown in column H, not a single engineman was killed during the 17-year period?

A. That is correct.

Q. I thought you had a fatal accident at Joseph City. Was that a passenger engineer that was killed?

A. That was a passenger train, as I recall it, Your Honor, it went through a bridge.

The Court: Yes.

The Witness: That was a passenger train, I think No. 8.

The Court: This fatality occurring on January 7, 1929, at Holbrook, that was the Peterson case over which you had considerable litigation?

A. No, the Peterson case wasn't a fatality. He struck a water crane at Flagstaff. The trial was held at Holbrook, as I well remember it, I attended it. I don't recall the name without going back to my working data of that brakeman involved in the Holbrook accident. It could be determined very readily.

The Court: Peterson subsequently died.

The Witness: This Holbrook, your Honor, locates the point of accident, and I know that Mr. Peterson that you [fol. 3807] refer to was injured at Flagstaff, Arizona.

Mr. Booth: No further questions?

Mr. Strouss: I have no questions at this time. I want to look at the form T reports before I decide.

Mr. Booth: Will it be convenient, Mr. Strouss, for you to let Mr. Sines know whether you want Mr. Bruns back?

Mr. Strouss: Yes, I will be glad to do that. I will let Mr. Sines know.

Mr. Booth: We have no further witnesses this evening.

The Court: The court will be at recess until ten o'clock tomorrow morning.

(Thereupon, the court stood at recess until February 7, 1941, at ten o'clock A. M.):

[fol. 3808] February 7, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: You may proceed.

Mr. Mason: I will call Mr. Bays.

G. A. Bays was called as a witness on behalf of the defendant and, being first duly sworn, testified as follows:

Direct examination.

By Mr. Mason:

Q. State your name.

A. G. A. Bays.

Q. Where do you reside, Mr. Bays?

A. 333 South Third Avenue, Tucson.

Q. What is your position with the Southern Pacific, Mr. Bays?

A. Assistant superintendent, Southern Pacific Company, headquarters, Tucson.

Q. Are you assistant superintendent of the Tucson division?

A. Yes, sir.

Q. What has been your experience in the Southern Pacific Company service, Mr. Bays?

A. I entered the service of the Southern Pacific Com- [fol. 3809] pany as a student brakeman in May, 1910 on the Western division, Oakland, California, and was promoted to conductor in May, 1913. At that time the divisions were split, and I was transferred from the Western division to what was known at that time as the Stockton division, and was then employed as conductor from May, 1913, to July, 1921. July, 1921, to October, 1921, assistant trainmaster; November, 1921, to June, 1922, conductor; July, 1922, to October, 1922, assistant trainmaster; November, 1922, to June, 1923, conductor; July, 1923, to November, 1923, assistant trainmaster; December, 1923, to June, 1924, conductor; July, 1924, to November, 1924, assistant trainmaster; November, 1924, to July, 1925, conductor; July, 1925, to November, 1925, assistant trainmaster; November, 1925, to July, 1926, conductor; July, 1926, to December, 1926, assistant trainmaster; January, 1927, to May, 1927, conductor; May, 1927, to August 13, 1928, assistant trainmaster. Then, on the 13th of August, 1928, I was promoted to trainmaster and transferred to the Tucson division, headquarters at Yuma, Arizona. I remained at Yuma, Arizona, as trainmaster from August 13, to June 30, 1932, as trainmaster.

Q. That was from August, 1928, to June, 1932, at Yuma? [fol. 3810] A. Yes, sir. During the depression I was transferred to Phoenix as terminal trainmaster, remained there from July 1, 1932, to September 30, 1933, and from October 1, 1933 to September 15, 1937, was trainmaster with headquarters at Phoenix, Arizona. On September 16, 1937, I was transferred to the Coast division as trainmaster, with headquarters at Watsonville Junction, remained there until January 31, 1938, and was promoted, transferred back to Tucson, Arizona.

Q. Promoted to assistant superintendent?

A. Assistant superintendent.

Q. And you have been here since?

A. Yes.

The Court: Gentlemen, before I overlook it, the fact is that today is a legal holiday, being Friday, February 7th, which is Arbor Day in Southern Arizona. In order that there may be no question as to the propriety of our proceedings, I wish that counsel would dictate into the record a stipulation that we may hold court today.

Mr. Strouss: I was wondering if it wouldn't be more proper after the proceedings are had and on the next court day to stipulate that the proceedings had today may become a part of the record as testimony properly and [fol. 3811] legally received.

The Court: That is satisfactory.

Mr. Mason: It is certainly entirely satisfactory to me; or it would be equally satisfactory to stipulate that today's proceedings may be regarded as taken in due form and order without regard to the fact that today is a legal holiday and as if the session had been held on a regular judicial day.

Mr. Strouss: That is agreeable to me.

The Court: Very well.

Mr. Mason: We can cover it both ways.

The Court: Proceed.

[fol. 3812] Mr. Mason: You were trainmaster of this division with headquarters at Yuma on August 4th and 5th, 1931?

A. Yes, sir.

Q. Were you in the courtroom yesterday when Mr. Sullivan testified and called attention to a derailment occurring at Dome on August 5, 1931, of train first No. 104 as shown in item 104 of Mr. Sullivan's exhibit No. 292?

A. Yes, sir.

Q. Are you familiar with the circumstances of the operation immediately preceding that accident as relating to the operation of that passenger train?

A. Yes.

Q. The showing on sheet No. 6 of exhibit No. 292 indicates that there was a train first No. 104. Have you examined the train sheets and will you say whether or not there was also a second No. 104 on that day?

A. Yes, sir, I have examined the train sheets and there was a first No. 104 and a second No. 104.

Q. How many cars were in second No. 104 leaving Yuma?

A. Second No. 104 leaving Yuma, consist 14 cars.

Q. Were there two sections to train No. 104 into Yuma [fol. 3813] from the west on that day?

A. No, sir, one section into Yuma.

Q. Did the train entering Yuma consist of more than 14 cars?

A. Yes, sir.

Q. Do you know and, if so, will you state why train No. 104 was broken up into two sections at Yuma?

A. It was necessary on August 5, 1931, to run two sections of No. 104 from Yuma on account of more than 14 cars to move, and in order to comply with the state law we ran the first section consisting of two head-end cars and a coach, three cars, and the second section, 14 cars.

Q. Were there at that time regularly assigned crews in passenger service?

A. Yes, sir.

Q. Was there a crew regularly assigned to handle train No. 104 out of Yuma eastward?

A. On this date the regular crew manned second No. 104.

Q. Where did you obtain the engine crew, the engineer and fireman for first No. 104?

A. From our extra list at Yuma, our enginemen's extra list which is known as "pool freight extra list" from the Phoenix district.

[fol. 3814] Q. Were the engineer and fireman handling first No. 104 regular passenger enginemen or extra freight enginemen?

A. They were extra freight and extra passenger men also.

Q. Why did you call an extra man from a freight pool to handle a passenger train movement?

A. Because this man that stood for this run was first out, and he was called in compliance with the working agreement.

Q. He stood for the work?

A. He stood for the work.

Mr. Mason: That is all.

Mr. Strouss: I have no questions, but I would like to have the train sheets.

Mr. Mason: Will you furnish Mr. Strouss with the train sheets?

The Court: It was the first section that was involved in the derailment?

A. Yes, sir, the first section.

Mr. Mason: Will you hand the train sheets for August 5, 1931, for the Yuma-Tucson-Gila district to Mr. Strouss and indicate if you will where the movement of first and second No. 104 is shown.

Mr. Strouss: After we reconvene, I may have some questions about that.

[fol. 3815] Mr. Mason: That is understood. Has your Honor any further questions?

The Court: No.

Mr. Mason: May Mr. Bays be excused for the time being?

The Court: Yes.

(Witness temporarily excused.)

W. P. Herbert was recalled as a witness in behalf of the defendant and having been previously sworn testified further as follows:

Direct examination (Continued).

By Mr. Mason:

Q. Mr. Herbert, at page 3061 of the reporter's transcript of your testimony while on the stand previously, you were asked by Mr. Strouss to verify certain figures excerpted by him from the forms 521 relating to operations on the Salt Lake and Tucson divisions?

A. Yes, costs per thousand gross ton-miles.

Q. Have you undertaken to verify those figures?

A. I have.

Q. Will you state whether there were any corrections in the figures recited to you by Mr. Strouss?

[fol. 3816] A. I found two to be corrected.

Q. The others were all correct?

A. Yes.

Q. Will you recite the correct figures, that is to say, the figures stated to you by Mr. Strouss which are incorrect and the corrected figures which should replace them?

A. The cost per thousand gross ton-miles on the Tucson division, main line only, as stated by Mr. Strouss for the

year 1927 was $0.454. As I checked it, it should be $0.504. For the same division, same cost, year 1925, in the record shows $0.582. I have checked it to be $0.578.

Q. Mr. Herbert, will you refer to exhibit No. 200, please?

A. Yes, sir.

Q. Have you made a study of the division records to determine which of the public crossings shown for the year 1938 were in towns and cities or within one mile of the entrance to the yard or siding on either side of the stations in such towns and cities, giving the total by number and the towns and cities where they are.

A. Yes, except that I checked the year 1939 which is the last year shown on my exhibit No. 200. Examination of the [fol. 3817] records of the Tucson division engineer's office reveals that at the following stations, namely, Yuma, Gila, Tempe, Benson, Willcox, Buckeye, Phoenix, Tucson, Chandler, Bowie, Casa Grande, Mesa, Cochise, Coolidge, and Douglas there was a total of 82 public road crossings. In addition to those eighty-two, there were two state highway crossings across the main track of the Southern Pacific in Arizona.

Q. Where were those?

A. One at Dragoon and one at Bowie at that time.

Q. Do you include in the 82 public road crossings that you have just recited a crossing at Mesa?

A. Yes.

Q. On highway 87.

A. Yes.

Q. And a crossing at Benson on highway 66?

A. Yes.

Q. I notice that you mention the station at Douglas. That involved an examination of the Rio Grande division record, did it not?

A. Yes, it did.

Q. Then, with the addition of these two at Dragoon and Bowie, there is a total of 84 crossings in all in the towns or immediately adjacent thereto out of the total shown for [fol. 3818] the year 1939, is that correct?

A. That is correct.

The Court: What is that total for the year?

Mr. Mason: As indicated by exhibit No. 200, at the end of the year 1939 it was 654.

Q. Have there been any of these 84 crossings eliminated or presently in process of elimination?

A. Yes, since 1939 up to the present time, three of the total of those 84 crossings have been eliminated or are in the process of elimination. The crossing of State Highway No. 66 at Bowie was eliminated by underpass; the crossing at Central Avenue in Phoenix was eliminated by underpass; and an underpass on State Highway No. 87 at Mesa, Arizona, is now under construction and the state highway crossing is now closed for traffic.

Q. Does your total of 84, or now 81, include any rural crossings or only those in towns?

A. Only those in towns mentioned and the state highway crossings that might be between those towns.

Q. You include state highway crossings?

A. Yes, State or Federal highway crossings. There happen to be no Federal highway crossings.

The Court: Mr. Herbert, what proceedings are necessary [fol. 3819] in order to establish a grade crossing? Can any individual at any point on the line demand that there be a crossing and the railroad fixes a crossing for him?

A. If they desire a public crossing, as I remember when I was here, they have to take it up with the State Corporation Commission, and the State Corporation Commission is the one that decides whether or not the crossing is necessary and if they find it to be necessary they order the crossing put in; as to private crossings, that, as I understand it, is just an agreement between the railroad and the party desiring the crossing. In the case of private crossings, they are covered as a rule by agreements.

The Court: You don't have the figures at hand that would show how many of these 654 crossings were private crossings and how many were public?

A. They are all public crossings.

[fol. 3820] Mr. Strouss: Those are determined by hearings before the Commission as to the public necessity and convenience?

A. Yes. There is one question the Court asked on my previous testimony, as to private crossings all having gates, whether it is fenced or not. There are cases where private crossings do not have gates, but they would still be considered private crossings and the parties entering into those agreements are responsible for the crossings.

Mr. Mason: Mr. Herbert, I show you an exhibit in a single sheet, consisting in part of a drawing or plan and in part of a tabulation, and bearing the title, "Estimated Cost of a Terminal at the Arizona-New Mexico State Line For the Reconsisting of Freight Trains." Did you participate in the making of the studies preparatory to this exhibit?

A. Yes.

Mr. Mason: May this be marked, if your Honor please, as defendant's exhibit next in order, No. 297?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 297 for identification.

Mr. Mason: Did you make a study of the track maps and [fol. 3821] station layout at the station of Cavot preliminary to the preparation of the chart and tabulation on Exhibit 297?

A. Yes, I did.

Q. Were you instructed so to do?

A. Yes.

Q. By whom?

A. By Mr. Sines.

Q. Are you familiar with the main line at or adjacent to Cavot?

A. Yes, I am.

Q. How did you acquire that familiarity?

A. Well, from my experience on the Tucson division, having worked on the ground at that point and in that vicinity for quite a few years, and a study of the records in the office of the division engineer at Tucson.

Q. Did you make any preliminary inspection of the track and the adjacent territory at Cavot for the purposes of this exhibit?

A. Yes, I made a special trip and study, on-the-ground study, for the purpose of this estimate.

Q. Now, will you say whether or not the actual track layout as indicated by your exhibit is your own plan or a plan which you were asked to consider and study from the standpoint of feasibility and cost?

[fol. 3822] A. Well, that plan was presented to me in its present form for me to ascertain the cost for such track construction.

Q. Now, what is the source of the information as to the mile-posts, grade and distances shown on the chart at the upper part of the exhibit?

A. It is from the company's track maps and profiles.

Q. What do the initials T. C. followed by degrees, minutes and seconds expressed in figures, indicate?

A. "T. C." represents total curvature.

Q. Are those figures taken from the track map?

A. Yes, they are.

Q. Is the station of Cayot immediately at the Arizona-New Mexico line?

A. It is, the Arizona-New Mexico line practically bisects the siding at Cayot.

Q. By the way, you show a dashed line at the siding of Cayot. Is that the present siding at that station?

A. Yes, it is.

Q. And the heavy line across the map is an outline of the main track, is it?

A. That is the main track.

[fol. 3823] Q. The light lines are what?

A. They are the necessary additional tracks and side-tracks.

Q. From what source did you obtain this figure of the grade which is indicated just below the map?

A. That is obtained from our detail profiles.

Q. This distance to Steins, what does the "E. SW" mean?

A. That means it is 1.73 miles from the east switch of this proposed layout to Steins, New Mexico.

Q. Would that be to the station at Steins?

A. Yes.

Q. And this figure of total curvature, state line to east switch, which you show, is that an aggregation of figures of total curvature indicated on the exhibit?

A. Yes, that is a summation of the total curvature shown for the curves shown between the Arizona-New Mexico State line and the east switch of this yard layout.

Q. Now, is that simply the total curvature of the main track, or is that the curvature of the main track considered by itself and then added to that the curvature of each of the switches as they are planned here?

[fol. 3824] A. No, that is just the total curvature of the main track alignment.

Q. Going to the lower part of the exhibit——

The Court: By the way, when was this estimate made, Mr. Herbert?

A. It was made in the last three or four weeks.

Mr. Mason: I will ask you to refer back to your exhibit 202. Did you follow the same methods in connection with the preparation of this tabulation and in the preparation of the figures which enter into the tabulation which was followed in preparing the figures on Exhibit 202?

A. Yes, I did.

Q. Where do you obtain your figures of the quantities, for example, the track feet of new sidings and of an additional track. Are those from scale measurements on the detail drawings?

A. Yes.

Q. The figures as to quantities of cut and fill? How did you determine those?

A. They are obtained from actual on-the-ground study.

Q. As to item 3, how did you obtain that figure?

A. That is also obtained from an on-the-ground study, and from our regular standard drawings of those culverts [fol. 3825] and the unit cost of their construction.

Q. As to item No. 6, did you take that from an on-the-ground study?

A. Yes, I counted the poles that would be necessary to be moved. Those, incidentally, are very heavy poles, heavy in the number of wires on the poles. They consist of about forty to fifty wires each.

Q. Now, you show in item 7, the cost of building a telegraph office. From what source do you take that figure, and the figure for the frame dwellings?

A. They are obtained from our standard drawings for such buildings and the cost that accrued from past construction of similar buildings.

The Court: Is there now a telegraph office at Cavot?

A. No, there is not. There is nothing there now except that one sidetrack and spur.

Mr. Mason: There is a concrete telephone booth there?

A. There is a concrete telephone booth there, yes.

Q. What is the source of the figures in line 4 of the estimate?

[fol. 3826] A. I obtained them from our signal engineer in San Francisco, having given him the layout plan and he in turn sent me the detail work necessary to be done and I

have examined those plans, and to my own knowledge they are correct.

Q. Have you yourself supervised the relocation of automatic block signals on this division?

A. Yes, I have.

Q. Is there any present water supply at Cavot?

A. No, there isn't.

Q. How did you obtain the figure in line 8?

A. That is an estimate of what it would cost if water was available. However, that might be problematical, whether they would find water for that money, and for that reason it might be understated. However, if water is obtained at any reasonable depth, it would cost about a thousand dollars to get it.

Q. Now, do I understand, Mr. Herbert, that as to the actual layout itself, you are not prepared to testify as to its details or the manner in which it would be used, but have simply made the study from a plan which was furnished to you?

A. That is right.

Q. In the same manner as in connection with Exhibit No. 202?

[fol. 3827] A. Yes, that is right.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: I think that is all we have of Mr. Herbert at this time.

The Court: Mr. Herbert, if this plan were followed, does your company contemplate switching your division point from Lordsburg over to Cavot, or is this merely a proposed construction right at the state line where you might reconsist these trains?

A. Well, that might be better explained by another witness, but, as I understand it, it is just for reconsisting trains.

Mr. Mason: I propose to have Mr. Sines testify as to the operations which would be carried on, your Honor, and to offer the exhibit after he has testified in connection with it.

The Court: Any further questions of this witness?

Mr. Mason: No.

Mr. Strouss: I have none at this time.

Mr. Mason: He will return for cross-examination this [fol. 3828] afternoon. Will you take the stand, Mr. Sines?

B. S. Sines was recalled to the stand, and testified further as follows:

Direct examination (Continued).

By Mr. Mason:

Q. Mr. Sines, will you refer to defendant's exhibit No. 297 for identification?

A. Yes.

Q. Did you prepare the contemplated plan of trackage at or adjacent to Cavot which is indicated on that exhibit?

A. I did.

Q. Now, will you state, in the first place, the reason why this trackage would be located at the point indicated on the exhibit rather than at some point either east or west of that location?

A. The initial switch at the west end of the layout is placed immediately at the Arizona-New Mexico state line, and the layout then proceeds from that point easterly, the idea being to avoid exceeding the Arizona seventy-car law within the State of Arizona and at the same time to cut down the extraterritorial effect of the law to a mini- [fol. 3829] mum.

Q. Now, will you explain why the plan contemplates the sidings as proposed on the south side of the track, and, as well, why the sidings as proposed are contemplated on the north side?

A. Yes. There are three sidings on the south side of the track, consisting of a 125-car siding and 2 70-car sidings, in the order of their position from the main line toward the south. The 125-car siding is for the purpose of building up 70-car trains which would arrive from Arizona. The other two 70-car tracks would be for the purpose of receiving and holding 70-car trains while the 125-car train is in the process of being built up. At those times when it would be possible to consolidate three seventy-car trains into two 105-car trains, if those trains happened to be operated to

the maximum 70-car limit, it would be necessary to provide tracks to receive and accommodate three trains. It would take some time to assemble the three 70-car trains into two longer trains, and enough track must be provided to clear the main line while that operation was in progress.

Q. Do trains actually follow each other in present-day operation so closely as to require such storage or hold [fol. 3830] tracks to be made available?

A. Yes. A very good appreciation of that situation can be obtained from the chart which I have previously introduced of train movements on June 18, 1938, which exhibit is No. 220. On that day there would have been an opportunity to consolidate the three trains which actually arrived at Cavot at approximately 8:20, 8:30 and 9:10 A. M., and the operation would have been for the first seventy-car train to enter one of the seventy-car tracks, for the second seventy-car train to enter the 125-car track, and for the second train to pick up 35 cars from the first train, making a 105-car train, and leaving 35 cars on one of the 70-car sidings. While this operation was in progress, the third train would have arrived and would have gone in on the third track provided for its use also. Such consolidation occurs when the trains are grouped in groups of three, that is, when three trains are operating closely together. When they are scattered out, as they were earlier on that day, the opportunity for consolidation is less favorable.

The Court: What is the total distance from the state line eastward to the end of your proposed sidetracks on this Exhibit 297?

[fol. 3831] A. That would be approximately 200-car lengths or 9200 feet, or 1.74 miles. That would be the distance from the state line to the east switch of the westbound 125-car track. Operations westbound would present a somewhat different picture in that 125-car trains would approach the state line from Lordsburg and would there be faced with the necessity of setting out 55 cars, but during that operation it would be necessary to provide for the train to enter a siding and to provide for a second track upon which the 55 cars could be set out. That process would be repeated two or three times during the day until 70 cars or more had been built up, at which time a short 70-car train would be operated from Cavot into Arizona.

Mr. Strouss: I think I should have my objection in here. This exhibit has not been offered yet, and there is testimony here I want an objection to as irrelevant, immaterial and purely speculative.

The Court: Yes, it should be offered.

Mr. Mason: I intended to offer the exhibit after the witness had supported it by a study of the situation.

Mr. Strouss: For the purpose of the record I would like to move to strike this testimony.

The Court: The motion to strike will be denied.

[fol. 3832] Mr. Mason:

Q. Mr. Sines, have you made a careful study of the situation at Cavot and on the north line of the Tucson division for the purposes of the showing indicated on exhibit No. 297 for identification?

A. Yes, sir.

Q. Will you say whether or not from that study the trackage indicated on exhibit No. 297 for identification represents the trackage which would be required and necessary if reconsisting operations would be undertaken at Cavot in order to avoid extraterritorial effect of the Arizona Train Limit law?

A. It does.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 297.

Mr. Strouss: I object to it as incompetent, irrelevant, and immaterial, calling for conclusions and purely speculative.

The Court: Objection overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 297.")

Mr. Mason:

Q. Mr. Sines, I think you said the distance from the link to the east switch was 9,700 feet and, as I read the exhibit, it shows a milepost 1125 just west of the state [fol. 3833] line and milepost 1127 a short distance west of the east switch layout as planned here. Will you give the matter further consideration and say whether or not your previous estimate of 9,700 feet is correct or slightly short?

A. The 9,700 feet is short, obviously it is something over two miles in length. My statement that there were two hundred car lengths between sidings was inadequate in that I hadn't allowed for switches and cross-overs. The length is approximately 2.1 miles.

Q. Mr. Sines, from your experience as a railroad construction engineer and from your experience with railroad operations generally, will you say whether or not the territory at and immediately east of Cavot represents a satisfactory location for a terminal?

Mr. Strouss: That is objected to as irrelevant and immaterial and calling for a conclusion.

The Court: Overrule the objection, you may answer.

The Witness: Will you read the question, please?

(The question was read by the reporter.)

Mr. Mason:

Q. By that I mean, the territory immediately along the [fol. 3834] main line as presently located?

A. It does not represent a satisfactory location for a terminal.

Q. Why is that?

A. Because of the curvature and grade involved in the layout on exhibit No. 297. The principal consideration for the selection of this location was to locate a yard immediately east of the state line, but such a location would be impracticable both from an engineering and from an operating standpoint.

Q. Have you in mind the 1.4 per cent ascending eastward?

A. Yes, sir.

Q. What does a grade of that character involve insofar as switching operations are concerned?

A. It would be a very difficult switching operation. By comparison, the Tucson yard is laid out on a one per cent grade and whenever a train enters the Tucson yard our employees are instructed, and they do, because I have seen them, set the hand brakes on 15 cars on the downhill end of the train and 10 hand brakes on the uphill end of the train before the engine is disconnected.

Mr. Strouss: May the record show my objection to all of [fol. 3835] this?

The Court: Yes, it may show the objection and it is overruled.

The Witness (Continuing): On this much steeper grade we would probably insist on setting the hand brakes on every car that was left standing on the side tracks not connected to an engine.

Mr. Mason:

Q. Is Cavot in the center of the helper district?

A. It is at the easterly end of the helper district. There is a helper district from San Simon to Steins, a distance of 14 miles, and Cavot is 3 miles from Steins.

The Court: The summit is located at Steins?

A. Yes.

Mr. Mason:

Q. Does the matter of the helper service in connection with the trains made up or cut down at Cavot enter into the problem at all?

A. That would present another consideration which would have to be overcome and which would be taken care of by assigning another helper engine to the San Simon-Steins territory. I can explain what that operation would be if you think it desirable.

The Court: The Court does not think it is necessary, [fol. 3836] Mr. Sines.

Mr. Mason:

Q. How does the trackage as you have planned and shown it on exhibit No. 297 compare with the trackage as it now exists at Lordsburg?

A. We have a yard somewhat larger than this at Lordsburg where the trains are received and from which they depart and in addition to that train yard we have several thousand feet of additional track to take care of any overflow or additional storage space required. In comparison to the yard at Lordsburg, this yard is considerably smaller.

Q. How does the layout at Cavot compare with the layout of the yard at Yuma?

A. The same thing holds true with respect to Yuma. At Yuma there are eight or ten train tracks providing for the

making or breaking up of the trains in addition to which there is additional storage space.

Q. What station force would be contemplated at Cavot if reconsisting operations were undertaken?

A. We would have to have a telegraph operator on duty around the clock, that is, for the entire twenty-four hours to hand up orders to train crews and helper engines and in order to permit the operation at Cavot to be properly supervised.

[fol. 3837] Q. Would there be any necessity for a watchman?

A. Yes, occasion might arise where loaded cars would stand on these tracks for several hours and it would be necessary to provide watchman service, although whether that would require full twenty-four hours would depend upon our luck with what would happen at Cavot. If we were not bothered by pilferage, we might not have to provide a watchman all the time but undoubtedly there would be a watchman at Cavot some of the time.

Q. Would this additional trackage require any additional expense for maintenance?

A. Yes, the maintenance figure that we used for estimating the additional cost of our siding program in connection with the long train program was ten cents per foot per year. This layout provides for an additional 28,489 track feet at a cost of ten cents per foot, produces $2849.00 maintenance expense per year.

Q. What is the annual cost of the telegraphers?

A. The three telegraphers would cost $7,183.00 per year.

Q. Wages?

A. Wages.

Q. Have you computed the interest cost on the invest-

[fol. 3838] ment required to produce this layout?

A. The interest cost on the investment charged at the same 4 per cent which I have used in connection with my long train siding program computed against the $186,460 would be $7,458 per year.

Q. What does that make the total annual cost as you have computed it?

A. $17,490.

Q. I will ask you whether, predicating your answer upon your experience as heretofore related, the contemplated construction and expense at Cavot could in any way be

lessened or whether the layout and expense you have indicated represents the minimum for the purposes shown?

A. This represents a minimum for the purposes shown. I have referred to the 1.4 grade and the exhibit itself also indicates total curvature of 410 degrees. We undoubtedly would make some effort to lessen that grade by line changes and to cut down the curvature by other line changes, all of which would increase the total cost of the project.

Q. Your study does not include any expense of line change or curvature reduction or grade reduction?

A. No.

Q. You are simply taking the track as it is and building [fol. 3839] sidings alongside of it?

A. Parallel to the main line, yes.

Q. Mr. Sines, in your testimony on February 4 at page 3543 of the transcript, there was some discussion as to the relative expense items appearing on form 521 and the proportion of those expenses which had been included in the cost exhibit, showing the savings which would result or did result from long train operation?

A. Yes.

Q. I refer particularly to exhibit No. 253 which shows a figure of $.5158 per train-mile saved based upon the application of the total net saving on the 1938 redispatch to the total figure of train-miles eliminated?

A. That is right.

Q. I believe you testified that form 521 for the Tucson division for the year 1938 reflects an average cost per train-mile of $1.285?

A. Yes.

Q. What, if any, is the significance of the difference between the $0.5158 which you show on exhibit No. 253 as the average value per train-mile saved and the $1.285 which is shown on form 521 as the average cost per train-mile for the year 1938 on the Tucson division?

[fol. 3840] A. There is no particular significance in the difference in the size of those two figures in the abstract but in reviewing my testimony later I realized I hadn't completed my thought that I had in referring to form 521.

Q. Will you please explain the relationship further, then?

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

Mr. Mason:

Q. Mr. Sines, you were about to state the figures which the form 521 for December, 1938, shows for the Tucson division—I have that here if your Honor wants to look at them and follow the testimony.

The Court: All right.

A. The Tucson division form 521 for December, 1938, shows the following: fuel excluding line freight charges, 49.5 cent; enginemen, 23.7 cents; trainmen, 31.5 cents; engine house, 6.3 cents; other locomotive supplies, 5.0 cents; train supplies and expenses, 2.9 cents. Total, 118.9 cents or $1.189.

Q. That is the train-mile cost of the main and branch, is it?

[fol. 3841] A. Yes; if the freight line charges on fuel had been included, the cost per train-mile amounts to 1.285 cents. The reason for excluding line freight charges mentioned here is that this represents the cost to the Southern Pacific Company for fuel oil delivered to the Southern Pacific Company at such points as Yuma, Arizona, and Sparks, Nevada, by which means the Southern Pacific Company avoids paying the California sales tax on fuel oil to be used outside of the state of California. The oil companies pay the commercial freight charges and add those commercial freight charges to the California price of fuel thus offsetting the freight charges by an equal amount of revenue to the Southern Pacific Company and thus furnishing the reason for excluding such charges in the cost statement which I have just quoted.

Mr. Mason:

Q. Then the cost of fuel excluding line freight charges represents the net cost to the Southern Pacific Company?

A. Exactly.

Q. The freight charges being added in to the delivered price at Yuma and then subtracted in figuring the cost on the form 521?

A. On the form 521 it is figured both ways, the $1.285 includes the line freight charges and the note "A" appear-

[fol. 3842] ing on the face of the form 521 refers to a computation on the back of the sheet wherein the line freight charges are excluded and the net cost of the fuel is shown per train-mile.

Q. What items have you included in the cost statement which you have prepared in connection with the redispatching study?

A. I have included items for fuel, enginemen, and trainmen which for the year 1938 on the Tucson division represented a total of $1.047 or 88.2 per cent of the total, $1.189.

Q. As to train supplies and expenses, will you explain that item and why it is not included?

A. The item of train supplies and expenses which is Interstate Commerce Commission Account No. 402 is an item associated with inspecting, lubricating, cleaning, heating, icing, and watering cars and would not vary appreciably because of the adoption of long train operation inasmuch as the total number of cars handled will remain the same.

Q. You leave it out on both sides of the computation, do you?

A. I have.

Q. What as to engine house expenses and other locomotive supplies?

[fol. 3843] A. Engine house account No. 400 and other locomotive supplies which is a combined figure representing accounts Nos. 397, 398, and 399 and which in 1938 represented 9.5 per cent of the total.

Q. That is to say, engine house plus locomotive supplies jointly represent 9.5 per cent?

A. Yes.

Q. Proceed.

A. And are associated with caring for and preparing locomotives for service with water, lubricants, and other supplies for train locomotives and incidental labor and would not appreciably increase or decrease with train lengths because while the new locomotives would be somewhat larger there would be fewer of them and these expenses would probably remain at approximately the same level as those actually experienced in 1938.

Q. What other item other than the items of fuel, wages for enginemen and trainmen, and these last three items which you have been discussing, that is to say, engine house, other locomotive supplies and train supplies and

expenses, enters directly into the cost of train transportation?

A. The other direct expense is locomotive repairs, which item I covered in testimony in exhibits Nos. 254 and 255.

[fol. 3844] Q. Mr. Sines, have you made a study of the forms 521 insofar as they show the total number of freight train-miles and freight train car-miles made on branch lines and main line or branch lines and main line combined of the Salt Lake and Tucson divisions?

A. I have.

Mr. Mason: I may explain that this is in connection with your Honor's question yesterday as to mileage in the two states of Arizona and Nevada as a possible index of the opportunity for accident and casualty in the two states.

Q. I will ask Mr. Sines first whether the main and branch line train-miles and car-miles by states are immediately available?

A. No, they are not.

Q. Can they be made available by a comparatively short study?

A. They can, and I propose to have them in the course of a week.

Q. Can you give the main and branch line figures of train-miles and car-miles of the two divisions to indicate whether branch line train-miles or car-miles are substantial in proportion to the total for the divisions?

[fol. 3845] A. I have those figures for both the Salt Lake and Tucson divisions as reported on the forms 521, the operating statistics sheets.

Q. For what period?

A. For the year 1940.

Q. Will you give the figures and the percentage relationship?

A. Train-miles, main line, total, 2,451,653; branch line, 134,064.

The Court: Which division is this, Mr. Sines?

A. Salt Lake division.

The Court: Will you read those figures, Mr. Reporter?

(The last answer was read by the reporter.)

A. Total main and branch lines, 2,585,717; percentage of branch to total, 5.19. Car-miles, main line, 205,733,213;

branch line, 1,815,273; total main and branch, 207,548,486; percentage of branch to total, 0.88 or less than one per cent. Tucson division for the year 1940, freight train miles, main line, 2,493,497; branch, 175,379; total main and branch, 2,668,876; percentage of branch to total, 6.58. Car-miles, main line, 150,317,995; branch, 4,852,706; total main and branch, 155,170,701; percentage of branch to total, 3.12.

[fol. 3846] Mr. Mason: Mr. Sines, have you before you a statement in two sheets entitled "Yuma, Arizona, to El Paso, Texas, via Gila and Lordsburg, Estimated Number of Meets and Passes Eliminated by Long Train Operation, June and August, 1938; Expanded to Annual Basis"?

A. Yes.

Mr. Mason: May we have this statement marked defendant's exhibit No. 298 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 298 for identification.

Mr. Mason: Did you prepare or supervise the preparation of this exhibit, Mr. Sines?

A. I did.

Q. Will you refer first to sheet two of the exhibit and explain just what you have done in connection with that sheet?

A. The figures at the top of sheet two and directly above the dates indicated on the chart represent train counts and counts of meets and passes which were made off charts prepared for those particular dates in a manner similar to charts prepared for June 18, 1938, Exhibit No. 220.

Q. Were those charts prepared from the actual train sheets of those particular days?

[fol. 3847] A. They were.

Q. Now, in making the count of trains, did you count them in the same manner as they were counted on Exhibit 220?

A. I did.

Q. And did you count meets and passes in the same way?

A. I did.

Q. Then, what was your next step after finding the number of trains and the number of meets and passes on the various dates which are indicated?

A. Those points were plotted on the chart, sheet 2, in accordance with the scales at the bottom and right-hand

side of the chart, the number of trains being indicated at the bottom, and the number of meets and passes along the right side of the chart.

Q. I take it that each of these squares reading to the right, that is, these large squares reading from the right from the zero indicated at the foot of the sheet represents 20 and each very small square represents 2?

A. That is right.

Q. And is the same scale used in reading from zero at the foot of the chart up toward the top?

A. Yes.

[fol. 3848] Q. Then the points are plotted according to the number of trains and the number of meets and passes?

A. That is right.

Q. Then, having plotted the points, what was the next step?

A. To compute the path of a line most closely fitting the points which had been plotted according to a process of analytic geometry which gave us the equation of the line indicated on the exhibit, sheet 2.

Q. Is that a rather common and ordinary problem of plane analytic geometry?

A. It is.

Q. And did you obtain the line which is plotted as a solid curve line on the sheet in that manner?

A. I did.

Q. And solved for the equation?

A. I did.

Q. And what is that equation?

A. M equals 0.042946T to the 1.925 power where M equals the number of meets and T equals the number of trains. That should be "number of meets and passes."

Q. Now, given the number of trains on a particular day, [fol. 3849] can you by means of that formula or that equation obtain the number of meets and passes in the territory between Yuma and El Paso via Gila, Tucson and Lordsburg?

A. Yes, in the average aspect.

Q. Now, will you turn to Sheet 1 of the exhibit and, referring to column B, state from what source it is taken?

A. That is taken from a count of the trains actually operating in freight service in the territory between Yuma, Arizona, and El Paso, Texas.

Q. Is that taken from the actual train sheets?

A. Yes.

Q. And column C, what is that?

A. That indicates the number of passenger trains operating on the dates indicated.

Q. That is a train count made in the same way as you made the train count for exhibit No. 220?

A. Exactly.

Q. And what is column D?

A. The total of the preceding two columns.

Q. Did you follow the same process as to the columns collectively headed "Actual" for the entire period of 61 days, from June 1st to 30th, and August first to 31st, indicated here?

[fol. 3850] A. I did.

Q. Now, how did you obtain the figures in column E for each of these days?

A. That was read off the chart which is sheet 2 of this exhibit, by entering the chart, using the number of trains indicated in column D, ascending on the train line to the point where the train line intersected the curve on sheet 2 and then reading the number of meets and passes on the scale to the right opposite the point of intersection.

Q. Is that equivalent substantially to solving the equation which is shown on sheet two?

A. The same thing.

Q. Now, going to the part of the first sheet headed "Redispatched," where did you obtain the figures in column F?

A. From a count of the freight trains appearing on the redispatch train sheets for the months of June and August.

Q. Is that an actual count from the redispatch train sheets for the dates indicated?

A. Yes, sir.

Q. And for passenger trains, did you use the same source?

A. The same.

[fol. 3851] Q. And obtained the totals in column H the same way as in column D?

A. Yes.

Q. How did you obtain the figures in column I?

A. Those figures are read off of the chart, sheet 2, in a manner similar to the figures appearing in column E.

Q. And the figures at the foot of the sheet appearing with the word "total" to the left of the line, what are those?

A. Those are summations of the figures appearing in the columns immediately above.

Q. And the line headed "meets and passes eliminated by redispatch study," what is that?

A. That is the difference in the totals, appearing at the foot of columns E and I.

Q. You subtracted the total in column I from the total in column E?

A. Yes.

Q. How did you obtain the final figure in the lower righthand corner of the first sheet of the exhibit?

A. By expanding the different figures just described in the ratio of 17.89 to 100.

Q. That is the ratio of the gross ton-miles made on the district in question during June and August, 1938, as com-
[fol. 3852] pared to the gross ton-miles made on the district during the entire year 1938?

A. Yes, sir.

Q. As explained in connection with previous exhibits?

A. Yes, sir.

Q. Have these computations been checked?

A. They have.

Q. Are you as a mathematician prepared to state that the equation as shown on sheet 2 of the exhibit is the correct solution?

A. I am.

Q. And does the exhibit represent the application of ordinary mathematical principles to this particular problem?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer the exhibit in evidence as Exhibit No. 298.

Mr. Strouss: Objected to as irrelevant and immaterial, purely speculative, and building an inference on an inference.

[fol. 3853] The Court: Just one question the Court wants to ask before ruling on it. It seems to the Court that the exhibit as now presented, which, of course, is another way of attempting to get into evidence the matter excluded under Exhibit 221, we do have now under the actual col-

umn a summary of the actual operations for the two months June and August, 1938, and also a summary of the redispatched trains during that same period. Now, while this other is not in evidence, I am going to refer to it. I notice, Mr. Sines, that on the exhibit 221, which was rejected, that using the mathematics there employed, that you arrived at a net decrease in the number of meets and passes for the year as being 15,337, whereas now you reach a total of 16,512. Can you reconcile those two figures?

A. Yes. The first figure of 15,000 plus was obtained by applying this formula against 24 individual days chosen for each month over the year 1938.

Q. That is, the first and the fifteenth?

A. Yes.

Q. Now, as a matter of fact, however, on exhibit 221, when you came to the matter of the redispatch, trains were not actually redispatched except during the months of [fol. 3854] June and August?

A. That is all.

Mr. Mason: You simply applied in getting the redispatched trains a constant factor of reduction in exhibit 221 for identification?

A. Yes.

Q. Whereas, in Exhibit 298 for identification you have used the actual redispatch?

A. Taken the results of the redispatching study for the 61 days, then expanded that to an annual basis.

The Court: Well, I am going to overrule the objection and admit it in evidence for what it is worth.

(The document referred to was received in evidence, and marked "Defendant's Exhibit No. 298.")

Mr. Mason: I suggest, your Honor, that even if the redispatch portion of the exhibit were entirely disregarded, we would still have the showing as between June and August actually, which would indicate how meets and passes can and do fluctuate as actual operations increase or decrease, because June was a month of heavy traffic and August a month of light traffic. We would still have a substantial comparison whether or not the redispatch columns are considered at all.

[fol. 3855] The Court: Well, it is somewhat speculative.

Mr. Strouss: I think that is putting it mildly.

The Court: I was sure you would agree with me.

Mr. Mason: Mr. Sines, have you prepared a statement in one sheet bearing the title, "Redispatch Study, June and August, 1938, Extraterritorial Effect of Arizona Train Limit Law Between Arizona-New Mexico State Line and El Paso, Texas."?

A. I have.

Mr. Mason: We ask that this statement be marked No. 299 for identification.

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 299 for identification.

Mr. Mason: I wish you would refer, please, Mr. Sines, to Exhibit 253, and will you explain what change or difference, if any, there is between Exhibit 299 for identification and exhibit No. 253?

A. In Exhibit 253 the average cost per train-mile saved is based upon a figure appearing on Exhibit 252, which includes the saving of $397,515 per annum estimated to accrue to freight service and $10,884 estimated to accrue [fol. 3856] in passenger service should long-train operation be adopted. On exhibit 299 I have eliminated the $10,884 saving accruing to passenger service in computing the average saving per train-mile saved of 0.4988 dollars appearing at the bottom of exhibit 299.

Q. Now, in exhibit No. 299 for identification, you show the blank reference in the footnote at the bottom. Should that be filled in with reference to Exhibit 252?

A. 252, yes.

Q. As I understand you, all that you have done is to recompute the figure indicated on Exhibit 253, but eliminated all reference to the passenger train saving which is computed at $10,884 per year, as shown on exhibits 231 and 252?

A. That is right.

Q. So that the total figure on exhibit 299 for identification, as representing the monetary saving between the Arizona-New Mexico state line and El Paso, is based entirely upon freight train operations?

A. That is right.

The Court: That accounts for the difference between the total figures shown in line 5 of exhibit 253 of $78,293 as compared to the total shown in this exhibit 299 of [fol. 3857] $75,712?

A. Yes.

Q. It is that fractional percentage of 10,000 that would apply east of the Arizona-New Mexico line?

A. It is made up largely of that amount of passenger service east of the state line, but there was also a small amount of passenger service between Los Angeles and Yuma that became involved in the computation.

Mr. Mason: This merely eliminates entirely any distortion which might have occurred on that account?

A. Exactly.

Q. Has the exhibit been compared and checked, Mr. Sines?

A. It has.

Q. Are the computations correct, to the best of your knowledge and belief?

A. They are.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No.

Mr. Mason: Has your Honor any questions?

The Court: No.

Mr. Mason: We offer it in evidence as defendant's Exhibit No. 299.

[fol. 3858] Mr. Strouss: It is objected to as wholly irrelevant and immaterial.

The Court: Overrule the objection. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 299.")

Mr. Mason: I think that closes our case, subject to cross-examination.

(Thereupon, the matter of the resumption of proceedings was discussed between Court and counsel off the record.)

The Court: Then, for the record, the Court will be at recess until February 17th at ten A. M., at which time the witnesses for the defendant required by the State for

cross-examination will be ordered to be present with whatever records may be necessary.

(Thereupon, the court stood at recess until Monday, February 17, 1941, at ten o'clock A. M.)

[fol. 3859] February 17, 1941, ten o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: You may proceed, Mr. Strouss, with cross-examination of the defendant's witness.

Mr. Strouss: With respect to the cross-examination of Mr. Bruns, a witness from the Santa Fe, I told Mr. Sines during the last week that if we could stipulate to the putting in evidence of the timetables, the employees' timetables, covering divisions or territory covered by his testimony and the engine ratings over that territory, that it would not be necessary to bring him back, and we are going to do that. We have the timetables but not the engine ratings.

Mr. Mason: Albuquerque Division, No. 78, and the Arizona Division, No. 94, those two employees' timetables are already in evidence in connection with the testimony of Mr. Mahoney, but the Pecos——

Mr. Strouss: They are?

Mr. Mason: Yes, you remember when the New Mexico Division and these two divisions were put in evidence, but the Pecos Division, that table is not in evidence. However, if this has the engine ratings——

Mr. Strouss: It doesn't have the engine ratings.

[fol. 3860] Mr. Mason: I have asked Mr. Bruns to supply those engine ratings. They will probably be in our hands early this week; in any event, they will be supplied.

The Court: Do you want to offer these?

Mr. Strouss: Well, if the other two are in, there is no necessity of putting in——

Mr. Mason: Those are in.

Mr. Strouss: Then just the Pecos Division.

The Court: They may be admitted in evidence, the employees' timetable No. 68 of the Santa Fe, the Pecos Division.

(The document referred to was received in evidence and marked, "Plaintiff's Exhibit No. 300.")

W. H. KIRKBRIDE was recalled to the witness stand.

Mr. Strouss: I will ask that this be marked for identification.

The Clerk: Plaintiff's Exhibit No. 301 for identification.

Mr. Mason: May I see the exhibit?

(Mr. Strouss hands the exhibit to Mr. Mason.)

[fol. 3861] Cross-examination.

By Mr. Strouss:

Q. Mr. Kirkbride, I hand you plaintiff's Exhibit 301 for identification. That is a part of the profile map of the Southern Pacific Lines between Tucson and the New Mexico-Arizona line, is it not?

A. Yes, sir.

Q. That is a part of the records of the company, of the Southern Pacific Company?

A. It is.

Q. And truly portrays the matters set forth?

A. It does.

Mr. Strouss: We offer this in evidence.

The Court: Any objection?

Mr. Mason: I would like to ask the witness a question or two about it, to be sure I understand what it is.

Q. Mr. Kirkbride, the document you have had handed to you and which is marked for identification No. 301, is the profile of the line in the neighborhood of the stations of Curvo and Sibyl, is it, on the north line of the Tucson Division between Benson and Dragoon?

A. Yes, sir.

Q. In the vicinity of mile-post 1037 to 1041 approximately, [fol. 3862] is that correct?

A. That is correct.

Q. Now, does this show the condition of the line as it is today or as of what date?

A. It isn't necessarily correct with reference to the data that is shown on the lower portion of the profile; for instance, with reference to 90-pound rail and full tie-plated and rock ballast, that data is not necessarily correct, but the profile, the elevations and the mile-posts represent the railroad as constructed.

Mr. Strouss: And curves?

A. I don't know where these prints came from, that is, they may be old prints, not necessarily reflecting local line changes.

Mr. Strouss: Let me interrupt here just a minute. I asked for the profile of the lines of the Southern Pacific. If there is any contention they are changed, I ask for profiles up to date, and I ask to defer my cross-examination.

The Witness: These blueprint profiles are substantially correct, but they are not kept up for statistical purposes. As I have explained, with reference to the tie-plates and rock ballast and rail, we don't keep the data on these profiles, so that these profiles are relatively——

[fol. 3863] Mr. Strouss: (Interrupting) Well, I would ask of counsel, if there is going to be any contention that these are not up to date, if there is, I want them up to date.

Mr. Mason: Your Honor, as the witness has just explained, we don't undertake to keep the data of changes of rail or changes of ballast or track construction on these data. Now, as the witness has so explained, this does show the grades and other characteristics of the line in that respect, I assume substantially as of the present date, is that correct, Mr. Kirkbride?

A. Substantially so; but may I explain that in the laying of rail and in the ballasting we apply spirals to our curves and make slight alterations to the central angles and the degree of curvature. I may further explain that in the original construction of this railroad, some curves were laid without tapers, which may be explained as easement curves at the end of the main curve. Some of them were equipped with tapers. Our modern method of aligning curves is to apply spirals, and these spirals are always longer than the old original tapers and, furthermore, if a curve doesn't have in its original construction a taper, why, we apply a spiral to it.

[fol. 3864] Mr. Strouss:

Q. When you do that, don't you make a new profile map?
A. We keep records in our office, but I cannot say that this represents the latest record.

The Court: Where did that profile in your hand come from; what is it taken from?

A. It is one of many sheets that came out of my office but it does not necessarily reflect the changes that might have been made as I have just explained. It is basic construction profile, may I say that, that it is the basic construction profile.

Mr. Strouss: I would like to have produced any records where there have been any changes in the road bed, that is, the grades or curves, and I asked for those profiles and assumed that I had everything to date. That is what was given to me.

The Court: I take it it is understood, Mr. Strouss, that the data with reference to the weight of the rails and the ballast, you are not concerned with those?

Mr. Strouss: No, I am not concerned with them.

The Court: Mr. Kirkbride, do you have a profile map in your office that is up to date if this one before you is not correct?

A. We have the data, but I wouldn't say that all profiles [fol. 3865] of this character are right up to the date with reference to the exception I have just made.

Mr. Mason:

Q. Do those exceptions make any substantial change in the ruling or maximum grades indicated on the face of the profile?

A. Probably they do not. I am not advised as to just the questions you are going to ask, but I would say I don't think they are of substantial merit.

The Court: In other words, you would say that the ruling grade is correctly shown on the profile in your hands?

A. The ruling grade can be determined from the profile that we have. The ruling grade is not shown on this profile, but the grade lines and curves as this railroad was actually constructed are shown correctly on this profile.

Mr. Mason: I think to save any question that we can agree that the changes which would be accomplished in the course of re-laying rail would be so slight they would not affect any data of grade or line and this may be taken as indicating the grades and curves to within a very small percentage; isn't that correct, Mr. Kirkbride?

A. I think so.

[fol. 3866] Mr. Mason: With that understanding we will not offer any objection to the exhibit.

The Court: It may be admitted in evidence.

(The document referred to was received in evidence and marked "Plaintiff's Exhibit No. 301.")

Mr. Strouss:

Q. Mr. Kirkbride, will you take up exhibit No. 301 and explain the different symbols that appear on the face of the exhibit. In the upper lefthand corner appears a line which the figures, one degree 24 minutes L. What does that indicate?

A. That means that at that locality there is a one degree and 24 minutes curve to the left.

Q. A little further to the right appear the letters "CC"?

A. That is a compound point of a curve.

Q. Two degrees L would mean——

A. That means that the one degree and 24 minutes curve to the left changed to a two degree curve to the left.

Q. And the next curve is indicated by the heavy black line; is that correct?

A. Approximately so, yes, sir, but the exact stationing is more accurate. For instance, the end of that curve is shown as engineer's station 7 plus 78.0. To get the full stationing, [fol. 3867] you look lower down and find that the full stationing is 29,927 plus 78.0.

Q. Dropping down, the figures plus 1.372 on the slanting line, what does that indicate?

A. That means that the actual rise on that particular stretch of track which is around one degree and 24 minutes grade is 1.372 feet per hundred feet of distance, or, in other words, a 1.37 per cent grade.

Q. Going back to the top again at the end of the heavy line there, there is a space and then another heavy line. What does that space between the two heavy lines indicate?

A. I do not understand the question.

Q. The figures 7 plus 78 engineer's station?

A. I have just explained what 7 plus 78 means.

Q. That is your engineer's station?

A. Yes.

Q. Continuing to the right, the black line ends at that engineering station. Does the fact that there is no black line there indicate tangent track at that point?

A. Do you mean the black line or white line?

Q. I am sorry, I have been talking from the photograph copy. It would be the white line.

A. Do you refer to the question between this point and [fol. 3868] this point (indicating)?

Q. Yes, if you will indicate the figures.

A. Following along on the same line, you will note figures reading 1 plus 01.5 BC, that is the beginning of a six degree and 30 minutes curve to the right. The distance between previous station mentioned, namely, 7 plus 78.0 and one plus 01.5 BC, is tangent track.

Q. Do you know what the scale of this map is?

A. By referring to the lower portion of the sheet, you will note the first notation to be 30,008 and ten space further across the letters 90. That means we have advanced one thousand feet. Each small subdivision in the horizontal way being equal to one hundred feet. Now, vertically, five of the small spaces represent five feet.

Q. At the top again, in a circle appears the figure 1037?

A. That is the distance from San Francisco.

Q. Does that indicate a milepost there?

A. A milepost physically on the ground is designated by a sign on the nearest telegraph pole. The profile shows the exact milepost by the stationing.

Q. The center of the sheet, is that a continuation of the line as shown across the top; in other words, this sheet is in [fol. 3869] three parts, is it not?

A. For the purpose of keeping a certain stretch of profile within the limits of the sheet, we have the method of breaking the profile and dropping to a lower elevation on the profile, but of course the point being the same elevation as that above.

Q. The part in the center is the continuation of the line after you reach the upper righthand corner of the sheet?

A. I will answer your question this way, that that profile in the upper line terminated at a point called zero plus zero, elevation 3769.306. Now we drop down lower on the profile sheet and we start at the same identical point again and it is marked the same elevation, namely, 3769.306.

Q. The only difference being that you drop down lower on the sheet?

A. Drop down and started a new datum plan.

Q. The same would be true with the bottom part?

A. That is true.

The Court: What do the figures at the extreme top of the sheet represent, 183 and 184 and so on?

A. That is the number of the curve. In other words, just for the purposes of maintenance the roadmasters or the division engineers would refer to curve No. 184 and the next curve is curve No. 185, the zero point being usually [fol. 3870] at the commencement of the division.

The Court: Approximately what distance is covered by this particular profile, exhibit No. 301?

A. Nine thousand feet.

Q. You mean on just the one-third of it?

A. I referred to the length of the profile as representing nine thousand feet of track. Then, the central portion again represents nine thousand feet of track and the lower portion again represents nine thousand feet, so; all told, there is twenty-seven thousand feet of track represented.

Mr. Mason: Mr. Kirkbride, I notice right under the word "Curvo" in the center section of the exhibit there is a vertical black line and then apparently there is an interruption of the profile with approximately a thousand feet there, where the vertical black line appears under the word "Curvo." Does that mean there is a thousand feet of the drawing that is not used?

A. It becomes necessary to establish what we call "equations" and it will be noted that on the lefthand side of the vertical line there appears engineer's station 30,007 plus 42.10. That identical point is equal to 30,006 plus 38.5 in [fol. 3871] measuring the line eastward. There will be other equations shown, for instance, near milepost 1039, 30,049 plus 75.3 is equal to 30,049 plus 74.9. Going back to the question as to the vertical line below "Curvo," there is quite a difference, so it is necessary for the draftsman to advance to the next rectangle in order to start his station.

Mr. Mason: The total distance covered by the drawing can be approximated fairly well from the mileposts, can't it?

A. Yes, sir.

Q. And that would indicate it is something in excess of four miles and not quite five, as I read it?

A. That is correct.

The Court: Mr. Kirkbride, what does this jagged line represent in your middle section of the profile? You have

a straight line, that line being crossed at intervals by this other wavy line.

A. That jagged line with valleys and peaks is a profile of the natural ground along the center line of the track as originally surveyed. For instance, immediately above the word "Curvo" and just to the left of the numerals "5 plus 55.1" the jagged apexed line represents a cut approximately twenty feet in depth. Immediately eastward or to [fol. 3872] the right of 5 plus 55.1 the jagged line is below the grade line which we call "formation grade" and that fill is about fifteen feet in depth.

[fol. 3873] Mr. Strouss: Under the lines at the top left-hand corner, I neglected to ask you what the symbol "T. C. 24 degrees, 39 minutes" means.

A. The total curvature or central angle of the curve is 74 degrees, 39 minutes and [illegible] seconds.

Q. And the letters "E. C." at the end of the line mean end of curve?

A. That is correct.

Q. And where it has at the lefthand of the line "B. C." would mean beginning of curve?

A. Beginning of curve.

Mr. Strouss: Do you have any more questions?

Mr. Mason: Mr. Kirkbride, I take it that the natural peaks and valleys of the surface of the ground as it existed at the time the line was constructed are considerably exaggerated by reason of the nature of the drawing?

A. That is true.

Q. The vertical scale is out of proportion to the horizontal scale?

A. That is true.

Mr. Strouss: May these be marked for identification?

The Court: They may be marked.

The Clerk: Plaintiff's Exhibits 302 and 303 for identification.

[fol. 3874] Mr. Strouss: Mr. Kirkbride, I hand you plaintiff's Exhibit 302 for identification and ask you is that a part of the profile map of the Southern Pacific Company between Tucson and the New Mexico-Arizona line?

A. That is correct.

Q. It is a part of the records of your office?

A. It is.

Q. And portrays the territory near Irene?
A. It does.

Mr. Strouss: We offer this in evidence.

Mr. Mason: This is a part of the line between Tucson and Mescal, is it, Mr. Kirkbride?

Mr. Strouss: East of Mescal, isn't it?
A. Yes, sir.

The Court: Pardon me, I didn't get the answer. Between Tucson and Mescal or the other side of Mescal, is it?

A. It is west of Mescal.

Mr. Mason: And which line is this, the former Southern Pacific or former El Paso and Southwestern?

A. It is the former Southern Pacific.
Q. This is the eastbound line of the two?
A. It is.

Mr. Mason: No objection.
[fol. 3875] The Court: It may be admitted.

(The document referred to was received in evidence and marked "Plaintiff's Exhibit No. 302.")

The Court: Pardon me, Mr. Strouss, where is Curvo located?

A. Curvo is between Benson and Dragoon.

The Court: Go ahead.

Mr. Strouss: I hand you plaintiff's exhibit No. 303 for identification and ask you if this is also a part of the profile maps of the Southern Pacific Company lines between Tucson and the New Mexico-Arizona line?

A. It is.
Q. This is the portion of the line following immediately after the Curvo sheet, is it not?
A. It is.
Q. This is also a part of the records of your office?
A. It is.
Q. And correctly portrays the information that is there given?
A. It does.

Mr. Mason: In accordance with our understanding?

Mr. Strouss: Yes, in accordance with our understanding. I offer this in evidence.

[fol. 3876] Mr. Mason: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Plaintiff's Exhibit No. 303.")

Mr. Strouss: Now, if counsel will stipulate, we will substitute the photographic copies for the original.

Mr. Mason: Yes, I have no objection to the use of the photographic copy instead of the original.

The Court: The substitution then may be made.

Mr. Strouss: And the photographic copies marked as an exhibit in place of the original?

The Court: Yes.

Mr. Strouss: Mr. Kirkbride, in your direct examination you testified, page 2055, "Question: Are the lines in Arizona lines of continuous curvature or with considerable tangent track? Answer: Long tangents and flat curves are characteristic of the alignment." Then at page 2061, "Now, in respect to tangent track and curvature from the Nevada state line eastward, is the situation in Nevada and Utah substantially the same as you described in Arizona?" And you answered, "They are." Now, will you take the profile maps of the lines through Nevada and show me the [fol. 3877] territory there that is substantially the same as that at Curvo and at Sibyl and at Irene?

A: Where are the exhibits?

Q. Let me ask you first, withdrawing that question for a minute, you testified at page 2060, "There are long stretches of tangent track and flat curves ranging from nine degrees and 30 minutes to four degrees, with a few six-degree curves."

Mr. Mason: I think, by the way, that line 25 there, where it says, "nine degrees" should read "no degrees." That is the way I have noted here a correction to be made in the transcript at that point. Obviously, nine degrees wouldn't be correct in that respect, because the witness said, "Ranging from nine degrees and 30 minutes to four degrees, with a few six-degree curves."

Mr. Strouss: If that is the testimony——

Mr. Mason: I know that was improperly recorded there.

Mr. Strouss: I was about to ask the witness to point out to me any nine-degree curvature in Nevada.

Mr. Mason: Well, he said that the maximum was six degrees, so it couldn't have been nine.

[fol. 3878] The Court: Is this the testimony of Mr. Kirkbride?

Mr. Strouss: Yes.

The Court: His attention might be directed to that testimony, and ask him if it is correct or not.

Mr. Strouss: If that should be "none" we can correct it.

Q. Do you see what I am referring to at the bottom of the page there, Mr. Kirkbride?

A. That word "nine" is in error and should be "no" or "zero," more properly "zero degrees." I want to make myself plain, change the word "nine" to "zero."

The Court: Well, the correction may be made then on the original record.

Mr. Strouss: As a matter of fact, Mr. Kirkbride, there is only one curve as sharp as six degrees in Nevada, isn't that true?

A. There are six-degree curves.

Q. Curves? Or, is it a six-degree curve?

A. Well, I can't be positive of that. I think there are some six-degree curves, but I am referring to the properties generally. I am comparing the State of Nevada as a whole with the State of Arizona.

Q. You are not talking about main line then?

[fol. 3879] A. Yes, main line, but the subject has to do with the lines across Nevada, and in this case, Utah, and the lines across the state of Arizona.

Q. From the Utah-Nevada line to the California-Nevada line?

A. Yes, sir.

Q. And from the New Mexico-Arizona line to the California-Arizona line?

A. Yes, sir.

Q. And you say there is more than one six-degree curve?

A. Oh, well, I can't positively say that, but this statement is correct, "there are long stretches of tangent track and flat curves ranging from zero degrees and thirty minutes to four degrees, with a few six-degree curves." It is my recollection that there are a few six-degree curves.

The Court: You mean in the state of Nevada?

A. Yes, sir.

Mr. Strouss: I would like to have you, Mr. Kirkbride, if you will, during the recess at noon check the profile in Nevada and be prepared to testify after noon as to how many six-degree curves there are on that line. There are no curves in excess of six degrees in Nevada, are there?

[fol. 3880] A. I don't recall any.

Mr. Mason: I take it, you are referring now, Mr. Strouss, to the principal main line which enters the state of Nevada at Calvada and leaves the state east of Lucin?

Mr. Strouss: That is correct.

Mr. Mason: You have no reference to the Fernley line or any of the branches?

Mr. Strouss: No, I am not referring to the branches, I am speaking only of the main line between Sparks, well, it would be the California line west of Sparks and the Utah Nevada line near Lucin.

Q. Now, then, will you refer to the profile map of the main line across Nevada, and point out what territory in Nevada is comparable to the territory shown in exhibits Nos. 301, 302, and 303?

A. Well; I don't have the profiles available. For instance, the line over the Pequops between Wells and Montello is quite comparable to certain summits we have in Arizona. Now, if you refer exclusively to the degree of curves, then the curvature over these summits in Arizona, which are very limited in length, are sharper than the curves, for instance, in Nevada over the Pequops. The [fol. 3881] gradients and the cuts and fills, the character of the formation and ballast conditions and climatic conditions are almost the same.

Q. Could you take these profile maps and indicate the territory as shown on the profile maps?

Mr. Mason: Have you the Nevada profile maps?

Mr. Strouss: These are the Nevada profile maps.

Q. Would it take very long to do it? Or, if you prefer, you can do it during the noon hour.

A. We are covering a good many miles of track, and I think my last answer is responsive to your question, is it not?

Q. I would like to have you show on the profile maps, Mr. Kirkbride.

A. What do you mean by the word "comparable"?

Q. You testified that it was comparable.

A. I was dealing with all the phases of the problem of comparing two railroads. Now, if your word "comparable" deals only with curvature, eliminating all other factors of the railroad, why, I will answer that, of course, accordingly.

Q. Well, show me the territory comparable so far as grades and curves are concerned, and then any other territory that you had in mind when you testified that it was [fol. 3882] comparable to the territory indicated in these exhibits; also that which would be comparable to the territory between Mohawk and Estrella in Arizona. You are familiar with that territory. Or Sibyl and Dragoon. Now, if you will do that at noon.

A. Yes, sir.

Mr. Strouss: That is all I have then.

Mr. Mason: Is that all you will have of Mr. Kirkbride?

Mr. Strouss: Yes, until he has examined these.

Mr. Mason: Will you want to suspend the cross-examination for the time being?

Mr. Strouss: Yes.

The Court: We will take our mid-morning recess at this time.

(Thereupon, a short recess was taken, after which proceedings were resumed as follows:)

[fol. 3883] JOHN J. SULLIVAN resumed the witness stand for further examination as follows:

Cross-examination.

By Mr. Strouss:

Q. Mr. Sullivan, in testifying concerning exhibits Nos. 260 and 261 of reportable accidents where employees were concerned, you testified, I believe, that under the rules an accident must be reported where the employee is incapacitated from performing his ordinary work for a period of at least three days out of the first ten days following the accident?

A. More than three days.

Q. Yes, more than three days out of the first ten days.

A. That is correct.

Q. If an employee were to have a finger cut off but reported back to work at the end of the third day and was permitted to work, that would not be a reportable accident, would it?

A. It may and it may not be. If he was able with the amputated finger to perform all of the normal and regular duties of the position, it would not be reportable. If he was not able to perform all of his duties, although able to [fol. 3884] perform some of the duties, it would be reportable.

Q. I am thinking of an accident with respect to a shop man. Isn't it a fact that a short time ago in the shops in Tucson an employee did have a finger amputated and was back to work at the end of the third day and no report was made of the accident?

A. I know nothing about it. May I read from the Interstate Commerce Commission's Bureau of Statistics interpretation of rules governing monthly reports of railway accidents issued March, 1934, on that subject?

Q. Yes, go ahead, that is a part of your exhibit, isn't it?

A. No, it is not. I only have the one copy. It is entitled "Interstate Commerce Commission, Bureau of Statistics," over the seal of the Commission, dated March, 1934, "Interpretation of Rules Governing Monthly Reports of Railway Accidents, 1922 Revision." Interpreting under the caption, "Sufficient to incapacitate," the phrase, "sufficient to incapacitate," means "sufficient to prevent a person from doing his usual work by reason of possible future consequence or because of pain or limitation of function, [fol. 3885] whether such pain or limitation results from the injury, subsequent infection or from the bandaging or treatment. Thus the laceration of a finger might not in itself prevent a man from doing his usual work, but if the hand is bandaged in such a way as to prevent him from doing his usual work his injury should be considered sufficient to incapacitate him. In like manner, if the dressing of an otherwise minor injury to a dining car steward, waiter, ticket clerk or other employee who is required to meet the public makes it undesirable for him to do so, in opinion of the railway management it must be considered sufficient to incapacitate him. If a trivial injury develops infection suffi-

ciently severe to prevent performance of usual work, that injury must be regarded as sufficient to incapacitate." Following under the caption, "Performing his ordinary duties," reads, "the phrase 'performing his ordinary duties' is interpreted to mean performing fully and acceptably and without extra assistance all the duties customarily included in the regular assignment of the employee at the time of injury. For example, a brakeman or switchman must be able to walk, throw switches, get on and off cars and set brakes. A fireman must be able to fire an engine, take water, shake grates, etc. A track man must be [fol. 3886] able to walk, remain standing at work, use wrench, shovel, rake, etc. A carpenter must be able to stay on his feet, walk, set and drive nails, use hand saw and other tools in a workmanlike manner. A machinist must be able not only to operate his machines but to do the customary work in connection with the placing of the material in position on the machine and removing same. A person whose ordinary duties consist of manual work must have the reasonable use of his hands and feet. He must be able to turn out a customarily acceptable amount of work."

Q. Your exhibit No. 262 covers casualties to all classes of employees, train and train service accidents, Class I railroads?

A. All classes of employees on duty.

Q. That includes both passenger and freight operations?

A. That is correct.

Q. And all types of accidents?

A. All types of train and train service accidents. It does not include nontrain accidents.

Q. All types of train and train service accidents?

A. That is right.

Q. Whatever the cause?

[fol. 3887] A. That is correct.

Q. It includes all employees, service employees in all classes of service such as yards and shops or whatever the class of service as long as it was the result of a train or train service accident?

A. Yes. You said "shop." It is almost impossible to have a train or train service accident in the shops.

Q. A shop employee might be out some place where he would be subject to a train or train service accident?

A. He would be reportable in that case, that is correct.

Q. The exhibit merely shows the trend of improvement in the number of casualties, isn't that the purpose of the exhibit?

A. Yes, it shows the improvement in the trend to all employees on duty who suffered reportable injury in train and train service accidents.

Q. From any cause?

A. From any cause, yes.

Q. The figures in columns B, C, D, and E, those include motor train operation, do they not?

A. That is correct, because if an employee was injured in a motor train accident it would be reported under either column F or G.

[fol. 3888] Q. I notice you have broken your exhibit down into sixteen years from 1923 to 1938 into three periods—1923 to 1928, inclusive; 1929 to 1934, inclusive; and 1935 to 1938; the first two periods being six-year periods and the last period being a four-year period. If the years 1929 and 1930 were eliminated from the second period, there would be very little difference between the last two four-year periods, isn't that true?

A. I would have to calculate that, but there would be a difference because the casualty rate, for instance, on a car-mile basis in column I, shows the casualty rate of 37.29 casualties per million car-miles, that is considerably higher than the rate in any of the years 1935 to 1938. Likewise, the year 1932 is higher than any year 1935 to 1938. The years 1933 and 1934 are lower than 1936 and 1937 only.

Q. How did you happen to select the periods which you did?

A. It might not have been necessary to select any periods but I have studied accident and casualty statistics for many years and from that study I know that comparing one year with another is not always a satisfactory measuring stick. In my opinion the six-year cycle was a satisfactory [fol. 3889] basis, it couldn't be equally divided and when I prepared the exhibit I anticipated I would have the figures for 1939 available for this latest block and that would still give cycles of six, six, and five. I could have prepared it with fewer years in the cycles but I didn't consider it necessary.

Q. It is possible from your exhibit to make the comparison of the four-year periods between 1930 and 1938, two four-year periods?

A. The way the exhibit is prepared, the comparison can be made one year with any other or anyone by making their own calculations could prepare any cycle of years that they preferred.

Q. That would be merely a calculation from the exhibit?

A. That is correct.

Q. Exhibit No. 263 has the same purpose, to show the trend of improvement, and it is similar to exhibit No. 262 except that it is reduced to trainmen and enginemen on duty?

A. In road service; it excludes enginemen and so-called trainmen in yard service.

Q. Is that true? Casualty to trainmen and enginemen on duty, all classes of service?

A. In any class of service where you may have road [fol. 3890] trainmen, that would include both passenger and work.

Q. This is limited to road service?

A. It is limited to road trainmen and enginemen on duty as classified by the Interstate Commerce Commission.

Q. Let me understand, do you mean on duty in road service or would service in the yards be included?

A. If there are any railroads which have road trainmen and enginemen working in yards, it would be included because this is an exhibit not as to a particular service but as to a particular class of employees.

Q. This includes both passenger and freight operations?

A. It does.

Q. And it also includes motor train operation?

A. Yes.

Q. This exhibit again is divided into two six-year periods and the four-year period?

A. That is correct.

Q. It is also possible from this exhibit to determine how much improvement there has been since 1930 by mere calculation?

A. That is correct.

[fol. 3891] Q. Exhibit No. 264 is a further elimination and applies to freight service only?

A. Well, generally that statement is correct, Mr. Strouss, but it is confined to road freight train men and enginemen on duty. It is not an exhibit as to service but as to a particular class of employees and generally road freight train

men and enginemen are in freight train service, but generally the road freight train men and enginemen and work trains and on occasions road freight train men and enginemen might be injured in a passenger train accident, run over by a passenger train, for instance, that would be included in this exhibit.

Q. This does include work train operation?

A. It does.

Q. And motor train?

A. Yes.

Q. The two previous exhibits included work trains also?

A. Yes, sir.

Q. This exhibit is to show the trend so far as this class of employees is concerned?

A. That is correct.

Q. Again the comparison is the two six-year periods and the four-year period?

A. That is right, and the comparison is by years also. [fol. 3892] In other words, casualty rates and the absolute number killed and injured and the casualty rates appear for each of the years shown.

Q. It is also possible from this exhibit by mere calculation to determine the percentage of improvement from, say, any period in 1930?

A. That is correct.

Q. Exhibit No. 265 is similar except that it is reduced to a still smaller class, road freight conductors, brakemen and flagmen on duty?

A. Yes, this exhibit eliminates from the other exhibit any casualties to engineers, firemen, and firemen's helpers.

Q. This also includes motor trains and work trains?

A. No, this does not include motor trains if they were classified as passenger trains.

Q. Motor trains in freight service would be included?

A. That is correct, but it includes work trains.

[fol. 3893] Q. Comparing the percentage of improvement of this class of employees with all classes, as shown by Exhibit 266, it would appear that the percentage of improvement, so far as conductors, brakemen and flagmen on duty is concerned, is less than with the other classes of employees?

A. I believe you mention Exhibit 266.

Q. 262.

A. Do you have in mind any particular——

Q. Well, I notice in the period in line 23, you show for all classes of employees 69.39 per cent as against 64.94 per cent, conductors, brakemen——

The Court: What exhibits are you referring to, Mr. Strouss?

Mr. Strouss: 262 and 265.

Mr. Booth: Those are the three sets of figures in the lower righthand corner?

Mr. Strouss: Yes.

The Witness: What column are you referring to, Mr. Strouss, column H on 265 and I on 262?

Mr. Strouss: Yes.

A. Yes, there is a greater improvement in the rate shown on line 23 of Exhibit 262 than Exhibit 265.

Q. That would be true with respect to the percentage [fol. 3894] of improvement using train-miles as the basis?

A. Yes, that is correct.

Q. And man-hours as a basis?

A. That is correct. Of course, on both exhibits the percentage of improvement is in some cases relatively close but substantial.

Q. Now, the next exhibit, 266, still further reduces the previous exhibits, what is shown in the previous exhibits, 266, covering casualties to road freight conductors, brakemen and flagmen, train service accidents caused by sudden stop, start, lurch or jerk of locomotive, car or train. Now, at the bottom you indicate that these items are taken from code causes 7007, 7008, 7009, and 7016. Are those all of the code causes that would cover that type of accident, Mr. Sullivan?

A. No, as I believe I explained, it would not include possibly the same type of accident if it involved a train accident, that is, if an employee was injured in an accident where there was also damage to equipment or property of the carrier in excess of $150, but the Interstate Commerce Commission doesn't have that particular type of code causes under sudden stops, starts, lurch or jerk of locomotive, car or train.

[fol. 3895] Q. What about code cause No. 7000, which is the first code cause under table 80 of the accident bulletin, information not sufficient to classify?

A. I believe that is,—well, I don't believe—I can't recall ever having seen any accident reported under that par-

ticular code cause. I would say that there would be none included. In accident bulletin No. 107 under "Road Freight Service" there is shown one conductor killed and it shows one brakeman injured.

Q. Is that table 80, Mr. Sullivan?

A. That is table No. 80.

Q. Will you read just the heading of that table?

A. "Table No. 80, Miscellaneous Train Service Accidents Not Elsewhere Classifiable."

Q. Now, will you turn to table No. 77, code cause, what is the heading for that table?

A. "Train Service Accidents to Persons While Getting on or off Cars or Locomotives."

Q. Code cause 6736?

A. "Sudden Stopping, Starting, Lurch or Jerk of Locomotive, Car, or Train."

Q. Now, turn to table 74.

A. "Train Service Accidents to Employees While Op-
[101, 3896] erating Handbrakes."

Q. And code cause 6411?

A. "Sudden Stopping, Starting, Lurch or Jerk of Train or Car."

Q. Don't you think those code causes should have been included in making up your exhibit 266?

A. It could have been included, but this particular exhibit was to represent the trend in casualties from the code causes that I gave.

Q. Well, you didn't intend to cover all casualties then in train service accidents caused by sudden stop, start, lurch or jerk?

A. I don't, except those that were——

Q. Under those four code causes?

A. Yes, as the exhibit indicated.

Q. But any that were of the same type casualty, I mean any casualties resulting from the same type of accident which would appear under another code cause, you had no intention to include it?

A. I know from my own knowledge that they are not of the same type as the other four code causes. It was to show trends year after year for a particular type of accident. I could have gone on indefinitely and selected other types of accident to show trends. There wasn't any intention of leaving out any particular type of accident that

[fol. 3897] belonged to a certain group. For instance, the code cause under 74, code cause 6411, sudden stopping, starting, lurch or jerk of train or car, invariably those are switching accidents.

Q. They might occur on the road in road operations, might they not, Mr. Sullivan?

A. Yes, while the road train is standing still.

Q. Or when the road train is moving?

A. No.

Q. Isn't it sometimes on grade operations necessary to use hand-brakes, might possibly be necessary?

A. In all of my experience, I have never heard of an occasion where it was necessary to control a moving train by hand-brakes.

Q. Suppose that retainers were in use on grade operations, that would require the men to be out on top of the train, would it not?

A. Well, I thought I was talking about operating hand-brakes. Are we going to a new subject?

Q. I asked you whether that wouldn't be true?

A. That is true, but it has no connection with hand-brakes.

Q. There wouldn't be any use of hand-brakes where the pressure on the brake might be so low that the engineer would call for brakes, isn't that possible?

[fol. 3898] A. Possible, but highly improbable. In my twenty years' experience on the road, I never heard of a case where it was necessary for the engineer on a freight train to call for hand-brakes, and the brakemen set the brakes by hand in order to control it or stop.

Q. Now code cause No. 6736, accidents getting on or off locomotives, cars, or trains, sudden stops, starts, jerks, or lurch, that could certainly happen in road operations, couldn't it?

A. Yes, but not very often. Referring to accident bulletin No. 107 for December 31, 1938, taking all of the railroads of the United States, for the whole year there were only 13 casualties of that particular type. Five conductors were injured and eight brakemen were injured.

Q. Of course, when you say only thirteen, that is a relative figure, thirteen men injured is thirteen men injured, isn't it?

A. That is correct. Just like all these other causes that are shown on the exhibit, they are all unfortunate and regrettable and the railroads would like to eliminate them.

Q. And of course those thirteen from that particular cause, if included here would increase the total number, [fol. 3899] of course, that would be true, wouldn't it?

A. It wouldn't affect the trend.

Q. Well, you don't know if they are not included in your exhibit?

A. The exhibit, Mr. Strouss, just included those four particular code causes.

Q. Your exhibit then is merely a trend exhibit?

A. No, not altogether; it reflects the absolute number of casualties and the casualty rate year after year from 1923 to 1938 to those particular causes.

Q. That is, code causes 7007, 7008, 7009, and 7016?

A. That is correct. Now, you can get an example of the trend comparing it with the other figures, taking for instance the year 1923 under code cause 6736, which we have just been discussing, where there was a total of 13 injured in 1923, which is also shown on the exhibit. If we included 6736, it would show one killed and 49 injured against the thirteen injured for 1938.

Q. In this exhibit you have also made a division of periods into two sixes and a four-year period?

A. Yes, just the same as in the preceding exhibits.

[fol. 3900] Q. And, of course, from your exhibit it is possible by calculation to make comparison between different years?

A. That is correct.

Q. Now, Exhibit 267, this covers casualties to passengers on trains, train and train service accidents, class I railroads?

A. That is correct.

Q. And it is to show the trend with respect to such casualties?

A. Yes, both as to casualty rates and the casualties in the absolute number.

Q. So far as the last ten years is concerned, there isn't much improvement shown?

A. Well, of course, that is possible when you get a casualty rate down as low as reflected by this exhibit, comparing over a period of years.

Q. Well, that is a fact, isn't it, that there is not a great deal of improvement shown in the last ten years?

Mr. Booth: We submit that the figures speak for themselves.

A. I was about to say that the figures speak for themselves. As I explained on my direct testimony, there is one item that shows a slight increase, one period compared [fol. 3901] with the other, and there is another thing that must be taken into consideration, consider this exhibit with the others, and that is the reporting basis. Many injuries to passengers are reported because on a reporting basis of over one day would include a great many casualties under the injuries that wouldn't be reported if the basis was two, three, or on the same basis as employees, more than three days.

Mr. Strouss: That has been true over the whole period covered by your exhibit?

A. That is correct.

Q. Exhibit 268, this exhibit covers grade crossing accidents, casualties in highway grade crossing accidents where an automobile was involved, all steam railways?

A. That is correct.

Q. That is passenger and freight operations both?

A. Everything.

Q. Motor trains?

A. That is correct.

Q. This again is a trend exhibit?

A. It shows the casualty rates by years as well as the absolute numbers and the comparisons with the indicated [fol. 3902] periods, one with the other.

Q. This is upon the basis of number of automobiles registered and train-miles operated?

A. That is correct.

Q. No, isn't there another factor that really should be taken into consideration in that, Mr. Sullivan; that is the factor of number of crossings?

A. No, I don't think that is so important unless you entirely disregard the question of the number of vehicles using the crossing. In other words, you could have the same number of automobiles, using three crossings, the hazard would be just as great as though there was only one crosing. The real basis of measurement if the figure

could be obtained or was available, would be the train-miles, that is, the number of train units and the number of vehicles using all of the grade crossings.

Q. Of course, during this period covered by your exhibit, there have been a great many grade separations?

A. Yes, and a great number of grade crossings added.

Q. The grade separations, when they are constructed, are in practically every instance at points where the traffic is the heaviest?

[fol. 3903] A. I think that is one of the most important considerations when the grade crossing elimination is considered.

Q. So that, when there has been a separation of grade, it has been at points where the traffic has been the heaviest.

A. I wouldn't say the heaviest, but where it is heavy.

Q. Where it is heavy.

A. But not in all cases, because there are many crossings on the Southern Pacific lines with which I am familiar where the traffic is heavy, but no grade crossing elimination has yet occurred.

Q. But, during this period, and that has been taking place year by year over the period, there has been the elimination of crossings where there was heavy traffic?

A. That is true, but notwithstanding that, you will notice the fairly constant casualty rate based on a train-mile basis, which indicates very close relationship to the volume of traffic.

Q. Well, that of course is a factor, coming back to my question, that a great many crossings which at the beginning of the period existed where there was heavy traffic, have in the different years been eliminated by grade sepa-

[fol. 3904] rations? You can answer that yes or no.

A. I know that there have been a large number of grade separations, but notwithstanding that I will say——

Mr. Strouss: Let me have an answer to my question. You will have your opportunity to explain any of this on redirect.

The Witness: I beg your pardon, I thought I could answer the question in my own way as long as it was responsive.

Mr. Booth: Just read the question, Mr. Reporter.

(The question was read by the reporter.)

A. Yes, that is one of the factors.

Mr. Strouss: If you have any explanation, I am perfectly willing to listen to it.

A. I was just seeking information. I possibly was ignorant, but I thought I could answer the question in my own way.

The Court: Well, you need not argue over it. The witness has answered the question and said "Yes." Go ahead.

Mr. Strouss: Now, taking your exhibit 269, of course, again going back to 268, again you have used the six, six and four year periods for comparison.

A. That is correct.

[fol. 3905] Q. Now, in 269, this is the exhibit which shows the train accidents and resulting casualties relating them to specific causes

A. Yes; not altogether causes, but types and causes.

Q. This includes all railroads, does it not?

A. That is right.

Q. Includes terminal and switching railroads?

A. It does.

Q. It will also include all other railroads other than class one railroads

A. It does.

Q. Such as logging roads and narrow guages? Or what have you?

A. It would include any railroad that would be required to report their accidents to the Interstate Commerce Commission, and some industrial railroads are not required to report.

Q. But it does include all of that type that are required to report?

A. It includes all those that are required to report and which the Interstate Commerce Commission includes in, for instance, their table No. 63 of their bulletin 107 for 1938.

The Court: We will take a recess at this time until two o'clock.

(Thereupon the court stood at recess until two o'clock P. M. this day.)

[fol. 3906] 2 P. M., February 17, 1941

All parties being present, as heretofore noted, proceedings were resumed as follows:

Mr. Booth: If the Court please and counsel, we have received accident bulletin No. 108 of the Interstate Commerce Commission for the calendar year 1939.

The Court: That was the document you have been expecting momentarily that you referred to the other day?

Mr. Booth: Yes, your Honor. While it bears the imprint of the government printing office of 1940, evidently they didn't release it until the last few days. We have only one copy of it. This will necessitate the addition of 1939 to all of those national exhibits and the reworking of the percentage comparisons of the periods. It will result in the way we have the exhibits set up of two six-year periods and a five-year period. If it meets with the approval of the Court and counsel, I would like very much when we reconvene on the 25th of March to submit those tables to 1939, inclusive, and for any additional cross-examination counsel may desire, but it is physically impossible for us to do that this week.

Mr. Strouss: I realize that. I have no objection but I [fol. 3907] think I would rather have that done and substitute it for the existing exhibits if agreeable so we would not fill the record up.

The Court: Need there be any cross-examination?

Mr. Strouss: Probably not. I was going to suggest if you have this ready a little while ahead you might let me have copies before the 25th if they are prepared before and I would know whether there is anything I want to cross-examine on.

Mr. Booth: We can arrange that.

The Court: If counsel will stipulate, there may be substituted in this record for these various national exhibits that have to do with this safety angle of this case an exhibit which will bear the same number as those now in evidence but which will include the statistics for the year 1939.

Mr. Strouss: Yes.

Mr. Booth: There are some narrative findings in the first pages of Accident Bulletin No. 108 to which we may desire to call the attention of the court.

The Court: If that is to be done, the Court would suggest that might be done during this session, during this week.

Mr. Booth: I can do that tomorrow morning and you [fol. 3908] can cross-examine on this if you desire. It would not strictly be redirect examination.

The Court: That is true.

Mr. Strouss: Some of that went in out of the previous bulletin over my objection, not objecting too strenuously but I don't believe that that matter which appears in the front of the bulletin is properly a part of the record. It is put out by the Interstate Commerce Commission but there are conclusions there which I don't think personally are properly admissible in evidence.

The Court: There is probably some merit to your contention, Mr. Strouss. The Court admitted similar testimony heretofore, it seemed coming from the body that it did, the Interstate Commerce Commission, that it might have some probative value but we will cross that bridge when we get to it.

Mr. Strouss: Instead of having it read in, if what is desired can be written up, if it is not too much, so that objection could be made to it, but it doesn't make much difference I suppose.

The Court: You may proceed with the cross-examination.

[fol. 3909] JOHN J. SULLIVAN resumed the witness stand.

Mr. Strouss:

Q. Mr. Sullivan, this morning we were discussing exhibit No. 266 and Code Cause No. 6411, that is, accidents due to sudden stop, start, lurch, and jerks to employees operating hand brakes and I understood you to testify that those accidents occurred usually, if not practically always, in yard service?

A. No, I didn't say that I don't believe. I said during switching operation. In other words, if a road crew switching on the road, if some conductor or brakeman in road freight service should be injured while setting a hand brake due to one of the shock causes, sudden stop, start, lurch, or jerk, such as a cut of cars which the employee might be riding in setting the hand brake striking other cars or on a standing cut of cars setting a hand brake and he would be injured on account of the other moving cars

striking that one, that would be included under that code cause and that is what I termed a switching operation.

Q. Those accidents are divided into what might be called two principal heads in table No. 74, is that correct; that is, yard service and road service?

[fol. 3910] A. Yes, they are all separated by classes of service and classes of employees.

Q. In 1938 there appears to have been a total of 98 casualties, one killed and 97 injured?

A. That is correct.

Q. Of those, 37 were casualties to employees in road service, that is, 4 conductors were injured and 33 brakemen and flagmen?

A. In road freight service, that is right.

Q. In 1936 there appear to have been 130 such casualties, 6 killed and 124 injured?

A. What year?

Q. 1937.

A. I thought you said 1936.

Q. I guess I did, but I intended to say 1937.

A. Six killed and 124 injured.

Q. Of those, 51 were employees in road service, 10 conductors injured, 3 brakemen and flagmen killed, and 38 injured?

A. That is correct.

Q. Coming to exhibit No. 270, this exhibit is the tabulation of data which appear in the Interstate Commerce Commission summary of accident investigation reports?

A. That is correct.

Q. And insofar as such reports relate to accidents in-

[fol. 3911] volving freight trains, it covers all summaries of reports from 1928 to 1939?

A. That is correct.

Q. And with respect to passengers, from 1934 to 1939?

A. That is another exhibit.

Q. Yes, the next exhibit, No. 271?

A. That is correct.

Q. Your tabulation is such as to indicate the length of the trains?

A. Yes, in certain groups.

Q. And the casualties occurring?

A. That is correct. Are you just talking about exhibit No. 270 or both of them?

Q. 270.

A. The casualties are all grouped. In No. 271 there has been a separation made of the casualties by certain classes.

Q. Just No. 270 at the present time.

A. All right.

Q. At the bottom of sheet No. 2 you have a summary as to number and percentage of accidents?

A. That is correct.

Q. As occurring on trains of 70 cars or less and over 70. Nowhere in your exhibit have you shown or attempted to [fol. 3912] show the number of trains of 70 cars and less operated and those over 70 cars?

A. You mean the total number in the aggregate?

Q. Yes.

A. No, that information was not available.

Q. If a freight train wasn't in any manner involved in an accident, it is included in this exhibit, is that correct?

A. That is correct.

Q. On sheet No. 19 I notice an accident, item No. 2, automobile being driven upon crossing at grade directly in front of a passenger train which was approaching at high speed, Interstate Commerce Commission investigation No. 1622, number of accident, one, killed eleven, injured 131; number of freight trains involved as to various lengths in cars, exclusive of caboose, 40 and less, one, that is, one freight train of 40 and less involved. Are you familiar with that accident, Mr. Sullivan?

A. Without reference to the investigation report, I wouldn't say.

Q. I wish you would turn to it and check me and see if I am correct in summarizing the accident. An automobile drove on a crossing in front of a passenger train?

A. That is correct.

Q. The passenger train struck the automobile. The [fol. 3913] freight train involved was a motor freight train on a parallel track going in the opposite direction from the passenger train and its only relation to the accident was that after striking the automobile a coach or two of the passenger train sideswiped one or two cars of the freight train derailing them?

A. I think possibly the best way to answer the question would be to either have the entire report copied or let me read exactly what the Interstate Commerce Commission said.

Q. All right, go ahead and read it.

A. (Reading) "Chicago, North Shore & Milwaukee Railroad. A passenger train struck an automobile at a grade crossing near Kenosha, Wis., on February 23, 1930, resulting in the derailment of the passenger train as well as a freight train approaching in the opposite direction, and causing the death of 2 occupants of the automobile and 9 passengers, and the injury of 125 passengers, 4 employees on duty, 1 employee off duty, and 1 other person, all of the passenger train; 3 of the injured passengers subsequently died.

"This accident was caused by an automobile being driven upon a crossing at grade directly in front of a passenger [fol. 3914] train which was approaching at high speed.

"In the vicinity of the point of accident this was a double-track line over which trains were operated by time-table, train orders, and an automatic block-signal system. The accident occurred at a grade crossing north of Kenosha, Wis., where a highway known as the Burlington Road crossed the tracks at a right angle. Approaching the point of accident from the north, the track was tangent for more than one-half mile, this tangent continuing for a distance of about 1 mile beyond the crossing. The grade for southbound trains was 0.2 per cent descending at the point of accident. Approaching the crossing from the east on the Burlington Road, the highway was tangent for a distance of 625 feet; within 525 feet of this distance the road ascended 13 feet, and it was then level to the crossing, 100 feet distant, and for some distance beyond the crossing.

"There was a 2-story building located about 150 feet east of the railroad tracks and 75 feet north of the highway, and two smaller buildings were located north of this building. After a westbound motor vehicle had passed these buildings the driver had an unobstructed view toward the north for more than one-half mile; south of the highway, the [fol. 3915] view was unobstructed for approximately 700 feet.

"The crossing was protected by a warning signal of the wigwag type, located north of the highway and 9½ feet east of the center line of the northbound track. This signal consisted of a bell and a swinging banner with a red light in the center of the banner, which was visible on the highway for a distance of 700 feet east of the tracks. This signal was actuated by trains approaching from either

direction when they encountered the control circuit, which extended for a distance of 2,400 feet on each side of the crossing.

"The weather was clear at the time of the accident, which occurred at 10:45 p. m.

"The automobile involved was a Buick 5-passenger touring car, occupied by two men, and was moving westward on the highway over the crossing at a speed variously estimated to have been between 25 and 45 miles per hour when it was struck by southbound passenger train No. 436.

"Southbound passenger train No. 436 consisted of five motor cars, of steel construction. This train departed from Milwaukee, Wis., at 10 p. m., on time, passed Racine, Wis., at 10:36 p. m., one minute late, and was derailed when it [fol. 3916] struck an automobile at a grade crossing while traveling at a speed variously estimated by the members of its crew to have been between 35 and 60 miles per hour; the derailed equipment then sideswiped northbound extra 456, which was passing at the time.

"Northbound freight train extra 456 consisted of 1 empty car, 12 loaded cars, and a caboose, hauled by electric motor 456. This train passed Kenosha tower at 10:40 p. m., and was derailed while proceeding over the Burlington Road crossing at an estimated speed of 15 miles per hour.

"The automobile was thrown into the air and the engine block fell out under the first motor car of train No. 436, derailing this train to the left or east, sideswiping the first car in extra 456. Train No. 436 was then diverted to the west and came to rest in a wide ditch on the west side of the southbound track, with the first car at a point 546 feet from the crossing. The track was torn up for a distance of 273 feet and the rail from the southbound track curved around under the freight train on the northbound track, causing the derailment of the first seven cars of this train; these cars remained upright. The automobile was demolished.

"The investigation indicated that the automobile ap- [fol. 3917] proached the crossing at too high a rate of speed passed around another automobile standing just east of the crossing, and then started over the tracks. In all probability the driver of this car saw the freight train approaching from the south and thought he could clear the crossing before the freight train reached it, and apparently did not look toward the north to see if there was

a train approaching from that direction. While there were buildings located to the right of the highway, they were about 150 feet east of the tracks, and the view was unobstructed between these buildings and the tracks, with the result that a train could have been seen approaching from the north for a distance of at least one-half mile. The evidence also indicated that the wigwag signal was in operation and that at least one of the trains was whistling as it approached the crossing. The automobile standing at the crossing no doubt obstructed the view of the driver of the approaching car toward the north to some slight extent, but there was no reason why he could not have prevented the accident had he exercised any of the care required to be exercised when approaching a railroad crossing at grade."

[fol. 3918] Mr. Strouss: That is the accident which is referred to as item 2 on sheet 19 of Exhibit 270 as an accident occuring to a freight train of forty cars and less, showing eleven persons killed and 131 injured?

A. Yes, involving a freight train.

Q. And the freight train involved was the train drawn by the electric motor which was described in your report?

A. Yes, it was a freight train drawn by an electric locomotive.

Q. Now, these reports from which your exhibit is made, your exhibit is made from these volumes which you have handed to me entitled "Summary of Accident Investigation Reports," is that correct?

A. That is correct.

Q. These are summaries of reports made by the Director of Safety, are they not?

A. Yes, they have the title, "Interstate Commerce Commission, Bureau of Safety, Summary of Accident Investigation Reports."

Q. While you have that open, these are issued quarterly, are they not?

A. That is correct.

Q. Now, turn to the introductory paragraph of that quarterly issue and read the first paragraph.

[fol. 3919] A. Of any particular report?

Q. I think you will find it is the same in each report.

Q. I am reading from Quarterly Summary No. 43 for January, February and March, 1930, under the caption "Interstate Commerce Commision, Bureau of Safety.

"The following is a summary of reports made to the Interstate Commerce Commision by the Director of the Bureau of Safety covering accident investigations which were completed during the quarter ended March 31, 1930.

"The statements in these reports of the number of persons killed and injured in the accidents investigated are the figures obtained at the time of the investigation of the accidents."

Q. Was that "completed" or "undertaken"?

A. Well, this copy reads "were completed." Evidently they are not the same in all.

Q. Would you mind just checking to see if that statement doesn't appear substantially in those words in the beginning of each quarterly report?

A. I think it does. In the report for No. 61, it is the same and reads, "The following is a summary of reports made to the Interstate Commerce Commission by the Direc-
[fol. 3920] tor of the Bureau of Safety covering accident investigations which were completed during the quarter ended September 30, 1934." Now, on sheet 20 of Exhibit 270, item 72, "Heavy run-in of slack due to a sudden stop following a heavy service brake-pipe reduction, I. C. C. investigation No. 2310, number of accidents, 1, persons injured, 5," and the column as to the number of cars in train appears to be 81 to 90; is that correct?

A. That is correct.

Q. Now, will you turn to that. That is the summary of the report, is that correct, that I have just handed you? train appears to be 81 to 90; is that correct?

Mr. Strouss: I would like to have that. I don't think it is necessary to read it into the record. I would like to have it copied in.

Mr. Booth: We have no objection.

The Court. That portion of the report indicated may be copied into the record.

The Witness: It is investigation number 2310.

The Court: If you will hand it to me, Mr. Booth, when you are through with it, I will read it now, then it may be copied into the record.

Mr. Strouss: May this be marked for identification?

[fol. 3921] The Court: It may be marked.

The Clerk: Plaintiff's Exhibit No. 304 for identification.

(The following matter is copied into the record at this point in accordance with the directions of the Court:)

"Southern Pacific Company.

"Derailment of a freight train at Reno, Nev., on November 19, 1958, which resulted in the injury of five employees.

"This accident was caused by a heavy run-in of slack due to a sudden stop following a heavy service brake-pipe reduction.

"In the vicinity of the point of accident this was a double-track line over which trains were operated by time-table, train orders and an automatic block-signal system. The current of traffic was to the left. The accident occured on the westward track as the train was passing the pasenger station at Reno, located 3.3 miles west of Sparks.

"Chestnut Street extended practically north and South; it was located four city blocks or about 1,500 feet west of the station. Approaching Chestnut Street from the east the track was tangent more than 1 mile, and a considerable [fol. 3922] distance beyond. The grade westward was level a distance of more than 2,000 feet, then it was 0.84 percent ascending a distance of 2,428 feet to Chestnut Street and a distance of 522 feet west thereof. At Chestnut Street, a siding designated as No. 6 track paralleled the main tracks on the north; a track extending eastward from Chestnut Street and designated as the south team track paralleled the main tracks on the south, the switch leading thereto being located at Chestnut Street; this street was not open across the track, barriers being located along the property line on each side of the railroad. The space adjacent to the tracks in the vicinity of the barriers was used for public parking of automobiles.

"The track structure consisted of 100-pound rail, 39 feet in length, laid on an average of 22 treated ties to the rail length; it was fully tieplated, single-spiked, ballasted with about 8 inches of crushed stone and was well maintained.

"The engine involved in this accident burned oil; the cab was at the front end and the tender was coupled to the rear. The speed of trains was restricted to 20 miles per hour over various street crossings within the city limits of Reno.

"The weather was clear at the time of the accident, [fol. 3923] which occurred at 11:25 p.m.

"Extra 4165 West consisted of 86 empty refrigerator cars and a caboose, hauled by engine 4165, a 4-8-8-2 type with ET-8 brake equipment. This train left Sparks at 11:15 p.m., according to the train sheet, proceeded through Reno and while traveling at a speed variously estimated to have been from 10 to 28 miles per hour with the forward portion approaching Chestnut Street and on an ascending grade, the engineman made a heavy service reduction of the brake-pipe pressure to avoid striking an automobile which was fouling the track in the parking area near the barrier at Chestnut Street, resulting in the train stopping suddenly after moving approximately 300 feet. The automobile was backed away from the track by its driver just in time to avoid being struck.

"The caboose and six cars in the train, namely, the sixth, sixty-fifth, sixty-ninth, seventy-eighth, eightieth, and eighty-fourth cars were damaged. One pair of wheels on the fifty-sixth car was derailed and a slip-over of couplers occurred between the seventieth and seventy-first cars, which separated about 18 inches, both knuckles remaining closed and the air hose connected. The truck bolsters on [fol. 3924] the B-ends of the sixty-fifth, sixty-ninth and eightieth, and the cast steel truck bolsters on the A-end and B-end of the eighty-fourth car were broken. The caboose was considerably damaged and its furnishings were knocked loose and broken. The employees injured were the conductor and four brakemen, who were in the caboose.

"Before departure from Sparks a terminal test of the air brakes of Extra 4165 was made and they functioned properly. The control delay valve was set as required for freight service so that brake cylinder pressure on the engine and tender would not increase at as high a rate as on the cars. After passing over the principal street crossings of Reno, the engineman opened the throttle to some extent. The forward portion of the train was on the 0.84 percent ascending grade; the rear portion was on level track, with the slack stretched in the train of 85 empty cars, and the speed approaching Chestnut Street was variously estimated to have been between 10 and 28 miles per hour. When about four car lengths distant, the engineman saw an automobile standing afoul the track in the space adjacent to the south barrier at Chestnut Street. He immediately made a heavy service brake-pipe reduction, the first

[fol. 3925] reduction made on the trip, and the train stopped within a distance of about six car lengths. The engineman did not close the throttle until after the train had stopped.

"From the resultant damage it appeared that there was a heavy run-in of slack. Six cars and the caboose were damaged; truck bolsters were broken on four cars; one car was derailed and a slip-over of couplers occurred between the seventieth and seventy-first cars, these cars being separated about 18 inches but the air hose remained connected and the knuckles closed.

"According to the evidence members of the crew who were on the caboose felt only one shock at the time of the accident, ordinarily at least two shocks occurred when there was a run-in of slack. However, the conductor was of the opinion that there must have been a run-in of slack the full length of the train. No shock was felt on the engine; nevertheless the engineman thought there had been a heavy run-in of slack. The engineman said that he made a service reduction of about 20 pounds but thought the brakes somewhere on the rear of the train had gone into emergency. However, the road foreman of engines thought the unusually rough stop was caused by a heavy service reduction [fol. 3926] and said that the engineman apparently made the reduction in accordance with the rules but that had he made an emergency application instead of a heavy service application probably the slack action and damage would have been much less because the brakes would have applied much more rapidly throughout the train. Only nine cars in the train of 85 empty cars and caboose distributed between the thirteenth and seventy-second cars, inclusive, were equipped with the "AB" type brake."

Mr. Strouss: Mr. Sullivan, I hand you plaintiff's Exhibit 304 for identification, which appears to be a certified copy of the report of the Director of Safety covering the same accident at Reno, Nevada. Will you examine that and see if that is the same accident that was referred to in the summary Report?

A. Yes, that is the same accident.

Q. That is the accident which appears here as Item 72, sheet 20 of Exhibit 270?

A. Yes, and it is also Item 225 on Exhibit 290.

Mr. Strouss: We offer this certified copy of the Director of Safety's—I have another copy of that not certified.

[fol. 3927] Mr. Booth: No objection.

The Court: It may be admitted in evidence.

(The document referred to was received in evidence and marked, "Plaintiff's Exhibit No. 304.")

Mr. Strouss: Now, at page 3644 of the record, you testified in answer to a question by Mr. Booth appearing at page 3643, "Is there in any of the investigation reports upon which this exhibit was founded any statement or indication in any manner that the length of the train was responsible for any of the accidents investigated?" Your answer was, "I have examined and read every report for the period covered by the exhibit, and in no case did the Interstate Commerce Commission state that the accident could have been or might have been avoided, or that the length of the train in any way was involved." Now, in making that answer, Mr. Sullivan, did you have reference to the summary reports or the *the* reports of the Director himself?

A. I had in mind the reports of the summary, because I haven't seen all of the reports that might not have appeared in the summaries.

Q. I wish you would take Plaintiff's Exhibit 304 and read, beginning with the last paragraph on page 9?

A. Page 9, under the heading of "Discussion," investi-

[fol. 3928] gation 2310:

"According to the evidence members of the crew who were on the caboose felt only one shock at the time of the accident; ordinarily at least two shocks occur when there is a run-in of slack. However, the conductor was of the opinion that there must have been a run-in of slack the full length of the train. No shock was felt on the engine; nevertheless the engineman thought there had been a heavy run-in of slack. The engineman said that he made a service reduction of about 20 pounds but thought the brakes somewhere on the rear of the train had gone into emergency. However, the road foreman of engines thought the unusually rough stop was caused by a heavy service reduction and said that the engineman apparently made the reduction in accordance with the rules but that had he made an emergency application instead of a heavy service application probably the slack action and damage would have been much less because the brakes would apply much more rapidly throughout the train. Only nine cars in the train of 85

empty cars and caboose distributed between the thirteenth and seventy-second cars, inclusive, were equipped with the "AB" type brake. The question of serial action with [fol. 3929] older types of air brakes was discussed in the report of this Bureau of the accident on the Western Maryland Railway at Oldtown, Md., on February 9, 1937. In that accident only one car in a train of 162 empty cars and a caboose was equipped with an "AB" type air brake and coupler slip-overs occurred at two points. In that report, the following statement was made:

'Only one car in the train involved was equipped with an "AB" type air brake. The action of the air brake on both occasions illustrates the fact that under such conditions the serial action with older types of air brakes is not fast enough, on freight trains of considerable length, to prevent destructive slack action when an emergency application takes place. This accident emphasizes the urgent need for improved brakes and points to the necessity for expediting the progressive change to the new "AB" type of brake on freight cars.'

"Conclusions. This accident was caused by a heavy run-in of slack due to a sudden stop following a heavy service brake-pipe reduction. Respectfully submitted, W. J. Patterson, Director."

Q. Now, having read that statement, would you still say that in no case has the Interstate Commerce Commission [fol. 3930] or its Director of Safety stated that the accident might or could have been avoided or that the length of the train was in any way involved?

A. Yes, I would make the same statement.

Q. You would still say that there is nothing in this report to indicate that the length of the train was involved?

A. Absolutely.

Q. Going to Exhibit 271, Mr. Sullivan, this is a similar tabulation only it involves passenger trains and includes only the years 1934 to 1939, inclusive?

A. That is correct, and as I explained in my direct examination, on account of a large number of grade crossing accidents involved, an additional cause was inserted in the exhibit No. 271 that doesn't appear in 270.

Q. What do you mean by "grade crossing accidents"?

A. On exhibit 271 appears as one of the causes "Collisions with vehicles at grade crossings." That type of accident is included under miscellaneous in exhibit 270.

Q. And it is here under column V, I believe in exhibit 271.

[fol. 3931] A. In 271 it is under IV, four, Roman four.

Q. Now, this also has the summary at the bottom segregating as to trains of 70 cars and less, and over 70 cars?

A. No.

Q. I mean fourteen cars and less, and over fourteen?

A. That is correct. There is a distribution between the trains involved which had fourteen cars and less, and those over fourteen cars.

Q. Of course, again you haven't attempted to show the aggregate number of trains over the period of fourteen cars and less and over fourteen cars?

A. No, that information is not available.

Q. And that covers accidents from all causes, too, doesn't it?

A. Those accidents involving passenger trains which were investigated by the Interstate Commerce Commission regardless of the cause assigned.

Q. Now, Exhibit 272.

Mr. Mason: Mr. Strouss, before we leave Exhibit 271, in order that the record may be perfectly clear, you asked if collisions with vehicles at grade crossings was at column V, and the witness said column IV. Mr. Sullivan, will you [fol. 3932] look at your exhibit 271?

A. Possibly I misunderstood his question. I thought he was referring to the items and he was referring to the columns.

Q. It also appears in classification four, commencing on sheet eight of the exhibit?

A. That is correct.

Mr. Strouss: Exhibit 272, Casualties to all classes of employees on duty, all classes of service, train and train-service accidents, Southern Pacific Company, Pacific Lines. Now, this is reducing the exhibit 262 to the Pacific Lines.

A. Yes, they include the same types of accident and the same group of employees.

Q. By the way, when you refer to the Pacific Lines in your exhibits, you include of course both the Salt Lake division and the Tucson division as a part of the Pacific Lines?

A. Yes, those divisions are part, two of nine operating divisions comprising the Pacific Lines.

Q. When you are making a comparison with the Tucson division, you include that division in the Pacific Lines in making that comparison?

A. I don't think I made any comparison of the Tucson division with the Salt Lake division, but the lines in Arizona [fol. 3933] and the lines in Nevada which are a part of those divisions are also a part of the Pacific Lines.

Q. Now, this is, of course, exhibit 262 is an exhibit to show the trend in improvement in accidents causing casualties?

A. It has for its purpose to show the absolute number of accidents, the casualty rates by years and the trends, comparing groups or cycles of years with others.

Q. Now, this includes, in your locomotive miles here, you include work trains, motor trains, helpers, and light engines?

A. That is correct, and yard switching-miles.

Q. And your employees will include shop or yard or any employee who may be injured by a train or train service accident reportable to the Interstate Commerce Commission?

A. If he was on duty, that is correct.

Q. If he was on duty. This exhibit indicates that there was an increase in the average on the Pacific Lines the last four years over the previous?

A. That is correct.

Q. Now, the next exhibit is a similar exhibit eliminating [fol. 3934] all employees, however, except trainmen on duty?

A. That is correct, and the trainmen include that group as shown in the note at the foot of the exhibit.

Mr. Mason: That is 273.

Mr. Strouss: Yes, 273.

Q. And the locomotive-miles includes again switching, helper, light engines, motor trains, and work trains?

A. Freight and passenger, that is correct.

Q. Now, exhibit 274, this is a total of casualties to all classes of employees on duty sustained in train and train service accidents, road freight train operation, reportable to the Interstate Commerce Commission, 1923 to 1939, inclusive, in the State of Arizona?

A. That is correct.

Q. Your exhibit doesn't indicate it, but this only shows accidents which occurred on the Southern Pacific Company's Pacific Lines, isn't that correct?

A. That is correct. The caption of the exhibit is "Southern Pacific Company, Pacific Lines."

Q. That is what was intended by that caption?

A. That is what was intended.

Q. How about accidents that may have occurred on the E. P. and S. W. and the Arizona Eastern prior to the mer-

[fol. 3935] ger?

A. They were not part of the Southern Pacific Lines, were not reported by the Southern Pacific Lines, and are not included in this exhibit.

Q. Wouldn't be included until they were included and became part of the operative property of the Southern Pacific Company?

A. That is correct.

Q. Now, I notice at the bottom of the page a double cross, "Sudden stopping, starting, lurch or jerk of car, or train." In going through the exhibit, Mr. Sullivan, I found 92 of such accidents, 17 of which occurred on trains of 60 cars or less, and 75 on trains of over 60 cars, or better than 81 per cent of those accidents, according to your exhibit, occurred on trains of over 60 cars in length. Have you checked your exhibit to determine that?

A. I have not.

Q. And I found that 28 of the 92 occurred on trains of less than 65 cars and 64 on trains of 65 cars or more, practically 70 per cent on trains of 65 cars or more in length. You haven't checked to determine that?

A. No, I haven't made any calculation of that kind.

[fol. 3936] Q. On sheet 12, item 507. Do you have that?

A. Yes, I have that.

Q. An accident which occurred on July 30, 1939, at Arlington, train of 59 cars, Brakeman R. A. Green was injured and the description of the accident is, "Either thrown or fell down in caboose." That is not the description as given in the form T report, is it, Mr. Sullivan?

A. It should have been.

Q. Do you have a copy of that form T here?

A. I have it in the office.

Q. I wish you would check that and see if it doesn't show that he was found in the caboose and it wasn't known whether he was knocked down or fainted or what had happened to him. If you will make a note and check it.

A. If it said he either fainted or was knocked down, that is the interpretation I put on the form either thrown or

knocked down in the caboose without going into detail. This is just a brief narrative of the accident, but I will examine form T.

Q. And bring the form T over here. Now, exhibit 275, that is a similar exhibit for the state of Nevada, is it not, Mr. Sullivan?

A. That is correct.

[fol. 3937] Q. And again, as indicated at the bottom of the first sheet, you have indicated accidents which were caused by sudden stopping, starting, lurching or jerking of car or train by a double cross-bar?

A. That is correct.

Q. And like the exhibit 274, this covers all classes of employees in all service when on duty?

A. No, confined to road freight train operation.

Q. That is correct, road freight train operation, but all classes of employees on duty?

A. That is correct.

Q. Which would include yard and shops, if they were injured?

A. If injured by a road freight train, that is correct.

Q. Includes branch operation?

A. Yes.

Q. Both the exhibits 274 and 275 include branch operations?

A. That is correct.

Q. And the locomotive-miles here as in Exhibit 274 includes the principal locomotive-miles in the freight and passenger trains, helpers and light engines?

A. No, exhibits 274 and 275 make no reference to locomotive-miles whatever.

[fol. 3938] Mr. Strouss:

Q. In counting the number of accidents caused by sudden stops, starts, lurch, or jerk of the car or train shown on exhibit No. 275, state of Nevada, I found 92 such accidents as noted on your exhibit, 72 occurred on trains of over 70 cars and 20 on trains of 70 or less, or better than 78 per cent on trains of over 70 cars. Did you check your exhibit in that respect?

A. Are you talking about accidents or casualties?

Q. I am talking about accidents now.

A. No, I didn't make that kind of a count of the accidents but I did count the casualties.

Q. Ten of those accidents on trains of 70 cars or less occurred in the year 1923?

A. I presume they did because during 1923 twelve casualties involved trains of 70 cars and less.

Q. That was a period before you had entered into any agreement with the Western Pacific for paired track operation?

A. I don't recall the date of that agreement.

Q. My information is that it was in 1925; I would like to have you check on that and see. Of course a great deal of the double track which you now have in Nevada other [fol. 3939] than the paired track operation had not been constructed at that time?

A. I think they had some double track, I don't know how much has been constructed since 1923.

Q. It is a fact, too, isn't it, at that period they were having particular difficulty with the triple valves due to the weakness of the graduating springs and the gaskets which were then in use which were causing a leakage in the triple valve and causing undesired emergencies?

A. I wouldn't say it was causing leakage in the triple valves, but I do know during that period it was during the time of the difficulty experienced with undesired emergency on account of the light graduating springs.

Q. It was just shortly after that or about that time that that graduating spring was strengthened?

A. I wouldn't say shortly after.

Q. It was not later than 1926?

A. Changing out the light graduating spring was in progress during that time. It was in progress as late as 1928 and 1929 when I was located on the Shasta division.

Q. There was also a change in the gaskets which were causing the triple valves to stick?

A. I am unaware of that.

[fol. 3940] The Court: We will take our mid-afternoon recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows.)

The Court: You may proceed.

Mr. Strouss:

Q. Mr. Sullivan, in checking your exhibit No. 275 I further found that eliminating the year 1923 the sixteen-year

period following that there were 78 accidents of that type; 68 of which were on trains of over 70 cars and only 10 on trains of 70 cars or less, or 87 per cent of them on trains of over 70 cars; and in the last thirteen years there were 61 accidents, only 3 of which were on trains of 70 cars or less, or 96 per cent of those accidents were on trains of over 70 cars. You haven't checked that, have you?

A. No.

Q. Along that line I wish you would turn to the year 1929. My check of your exhibit shows from 1929 to 1938, inclusive, there were 41 accidents, all of which occurred on trains of over 70 cars. If you will check the year 1929, I think you will find 6 of that type of accident as indicated by you in that year. That is on sheet No. 5?

A. That is correct.

Q. All of those accidents occurred on trains of over 70 [fol. 3941] cars?

A. That is correct.

Q. In the next year, 1930, there were 7 such accidents, all of which occurred on trains of over 70 cars?

A. That is correct.

Q. In the next year there was one on a train of 79 cars?

A. That is correct.

Q. In the next year there were five, all on trains of over 70 cars?

A. That is correct.

Q. In the next year there were four, all on trains of over 70 cars?

A. That is correct.

Q. In the next year there were four, all on trains of over 70 cars?

A. That is correct.

Q. In 1935 there were three, all on trains of over 70 cars?

A. That is correct.

Q. In 1936 there were five, all on trains of over 70 cars?

A. That is correct.

Q. In 1937 there were four, all on trains of over 70 cars? [fol. 3942] A. That is correct.

Q. In 1938 there were two?

A. That is correct.

Q. Both on trains of over 70 cars?

A. That is correct.

Q. So that from 1929 to 1938, inclusive, every accident of that sort was on a train of 70 cars or more?

A. That is correct.

Q. In 1939 there were three accidents, one on a train of 104, one on a train of 79, and one on a train of 69 cars?

A. That is correct.

Q. Exhibit No. 256, this exhibit is a comparison of casualties to all classes of employees on duty, all classes of service, sustained in train and train service accidents in the states of Nevada and Arizona?

A. That is correct.

Q. This includes both freight and passenger train service?

A. Yes, all classes of service.

Q. Branch as well as main line?

A. That is correct.

Q. Locomotive-miles here are the miles operated by helper or principal engine on both freight and passenger [fol. 3943] helper and light motor trains and work trains?

A. Yes, sir.

Q. And employees include all employees, shop and yard, if they were injured by a train or train service accident?

A. That is correct.

Q. There aren't any motor trains in Nevada, are there, Mr. Sullivan?

A. No, there has been none there for several years.

Q. This includes the years 1923 to 1939, inclusive?

A. That is correct.

Q. The territory in the two divisions hasn't been the same during all of that period, has it?

A. This is not a division showing, it is a showing by the states but the railroad hasn't been the same.

Q. In Arizona the total main line in 1923 was around 300 to 400 miles, was it not?

A. I would have to check that. I know it is not the same as it is now because since that time the El Paso and Southwestern was purchased, the line through Phoenix was constructed, and the operation of the Arizona Eastern was [fol. 3944] absorbed by the Southern Pacific, so I know there was some difference.

Q. The Arizona Eastern included that Globe operation?

A. That is correct.

Q. I wish you would check and give us the mileage, main line and branch; I think it is about 390 main line and 155 branch, but I would like to be sure of it.

A. I will make that check, but I would like to make it clear that this exhibit has not attempted to show up any rates against road mileage and the identical locomotive-miles have been included where the same casualties are shown on the exhibit. In other words, I didn't include any locomotive-miles on any except the operated lines and likewise only the casualties occurring in the Southern Pacific operated lines in Arizona and Nevada for the respective years.

Q. I understand, but I would still like to have the territory involved shown.

A. I will obtain that.

Q. You don't know when the paired line operation began?

A. No, I will obtain that. I don't remember the exact year.

[fol. 3945] Q. This would also include switching operations, wouldn't it?

A. It would.

Q. Of course there is substantially more switching in Arizona than in Nevada?

A. Yes, because there is a direct relation between switching and the number of trains operated.

Q. There is considerably more traffic in the state of Arizona originates in the state of Arizona than in the state of Nevada, isn't there?

A. I think there is some difference, I don't know just what the figures are.

Q. That would have some effect upon switching also, wouldn't it?

A. It would have some but not as much as the other.

Q. You think that difference in traffic is small, that is, traffic originating in the two states?

A. No, I know from my own experience the more trains you have the more yard switching——

Q. (Interrupting:) I did not ask you that, I am asking you whether you know whether the difference in the traffic originating within the two states is substantial or not substantial?

A. I wouldn't want to say whether it is substantial or [fol. 3946] not substantial, I know there is a difference.

There is more traffic originated in Arizona than in Nevada because there is no perishable traffic originated in Nevada and perishable traffic is originated in the Yuma territory and the Salt River Valley.

Q. Of course that perishable traffic in the Salt River Valley requires the operation of so-called "turnaround" or gathering trains, doesn't it?

A. Yes, that is what we call road freight train operation.

Q. Which you wouldn't have in the state of Nevada?

A. That is correct. It is a type of local freight service.

Mr. Mason: I don't think you finished your answer, Mr. Sullivan, when you were interrupted.

Mr. Booth: It was not responsive to the question.

Mr. Strouss:

Q. Exhibit No. 277 is a similar exhibit except that the class of employees involved are employees on duty in road freight train operation?

A. That is correct.

Q. That would eliminate yard operations and switching [fol. 3947] except road switching?

A. And passenger train, that is correct.

Q. The locomotive-miles include the same items except passenger trains are not included?

A. Locomotive-miles are not included in exhibit No. 277.

Q. This again is an exhibit in which you show the trend of casualties in the two states, comparing the trend?

A. It shows the casualty rates by years and the trends as well.

Q. And of course covers the same periods as the previous exhibit?

A. That is correct.

Q. And so far as territory is concerned, what was said about exhibit No. 276 would apply to this exhibit also?

A. That is correct.

Q. Exhibit No. 278 is a tabulation of casualties to all classes of employees on duty, road freight train operation, train and train service accidents for the two states tabulated as to the cause and as to the employees involved?

A. That is correct. It is really a breakdown of exhibit No. 277.

Q. These causes shown in here are taken from the Inter-
[fol. 3948] state Commerce Commission designation of causes?

A. Yes, it conforms to the classifications used by the Interstate Commerce Commission.

Q. Cause No. 5, "Miscellaneous Train," that would take in a great many different types of accidents, wouldn't it? For example, cars that buckle in slack action accidents would come under miscellaneous train?

A. Yes, if no derailment of any of the cars resulted. Miscellaneous train also includes collisions at highway grade crossings where a derailment does not occur and where damage to equipment or property of the carrier exceeds $150.

Q. In the train service accidents that type of accident would appear under miscellaneous train service accidents. In other words, it would be an S-j designation?

A. Yes, where casualties occur, they are included under S-j if there was no damage exceeding $150 in the accident.

Q. No. 279 is similar to exhibit No. 277 except that it is limited to freight conductors, brakemen, and flagmen on duty?

A. That is correct.

Q. Other classes of employees are eliminated and pas-
[fol. 3949] senger train and yard switching and so forth are eliminated?

A. That is correct, except that if a road freight conductor or brakeman or flagman was on duty in connection with his own train and was injured by a yard engine he would be included in this exhibit because this is not an exhibit as to service but as to a particular class of employee.

Q. This includes branch line operation?

A. Yes.

Q. Of course what was said concerning exhibit No. 276 and the difference in territory during the period would apply here also?

A. That is correct.

Q. No. 280 is a similar exhibit except that it is further limited to the cause of the accident?

A. That is it, a certain particular type of accident.

Q. Accidents caused from sudden stop, start, lurch, and jerk of train, that is, a casualty to freight conductors, brakemen, and flagmen on duty?

A. That is correct.

Q. Of course if that accident at Arlington should appear from the form T not to have been caused by a sudden stop, start, lurch, or jerk of train then column K, 1939, would [fol. 3950] become three rather than four, wouldn't it?

A. Yes, if there is any error in the classification, but I am not aware that there was. That would still leave a higher casualty rate in Arizona than Nevada.

Q. Exhibit No. 281 simply shows cases where death has occurred either at the time of the accident or subsequent?

A. Yes, it shows narratively the occurrence of the serious accidents in the two states related in the aggregate, there being fifteen in Nevada.

Q. Of course an accident can be serious without resulting in death?

A. Well, any accident that causes death or the loss of limbs is the most serious accident occurring on the railroad.

Q. Isn't there a case shown in your exhibit No. 274 of a brakeman named Willoughby who was thrown from a train by a sudden stop, start, lurch, or jerk of the train and has been in the state hospital ever since?

A. Yes, sir, but the Arizona law didn't prevent it.

Q. That was in 1928?

A. That is correct.

Q. Wouldn't you call that a rather serious accident? [fol. 3951] A. I certainly do.

Mr. Mason: I think the inference is in the record from the questions of counsel that this exhibit No. 281 is confined to fatalities. Of course that is obviously not true from the face of the exhibit.

Mr. Strouss: Or amputation of limbs. That is all that is included, isn't it?

A. Yes, as the title of the exhibit indicates, "Fatalities, Subsequent Fatalities, or Amputation of Limbs."

Q. Is exhibit No. 282 somewhat of a summary of exhibit No. 281 for the state of Nevada?

A. It is a summary that may be checked and calculated from exhibits Nos. 277 and 279 and the details can be checked from exhibit No. 281.

Q. The exhibit pretty well explains itself, doesn't it?

A. I think it does, yes, sir.

Q. Exhibit No. 283, "Casualties to All Classes of Employees Off Duty; Road Freight Train Operation," I be-

lieve there is a total of six shown for the state of Arizona, 1923 to 1929?

A. That is correct.

Q. And, three of those were caused by a sudden stop, [fol. 3952] start, lurch, or jerk of train?

A. That is right, one on a 62-car train and two on 60-car trains and one of them occurred on the locomotive.

Q. Exhibit No. 284 is similar to exhibit No. 283 except it is for the state of Nevada?

A. That is correct.

Q. And there are nine accidents there?

A. That is correct.

Q. Five of which resulted from sudden stop, start, lurch, or jerk of train?

A. That is correct.

Q. Resulting in six casualties?

A. That is correct, and the last one occurring over twelve years ago?

Q. Two of them were on a 94-car train, two on a 55-car train, one on an 88-car train, and one on a 76-car train?

A. That is correct.

Q. Exhibit No. 285 gives the casualties to persons carried under contract. There seems to have been one in Nevada and eleven in Arizona during that seventeen-year period?

A. That is correct.

Q. Five of those in Arizona were due to sudden stop, start, lurch, or jerk of train occurring on 50, 58, 59, 68, and [fol. 3953] 70-car trains?

A. That is correct.

Q. Exhibit No. 286 and the next one have to do with derailments due to defects in or failures of freight car equipment?

A. That is correct.

Q. And there appear to have been 105 accidents with total damage of $201,577 in Arizona and 65 accidents with total damage of $100,141 in Nevada in the seventeen-year period?

A. That is correct.

Q. From the summary at the bottom of sheet No. 2 it appears that 35 of those 65 accidents in Nevada were on trains of over 70 cars?

A. That is correct.

Q. Neither exhibit No. 286 or No. 287 in any way shows the relative number of trains of over 70 cars and trains of 70 cars or less that were run during this period?

A. No, it does not. Of course those being due to defects in or failures of freight car equipment, such an accident is not associated to a train but to the individual car regardless of the number of cars in the train.

Q. Exhibit No. 288 is a comparison of information shown on exhibits Nos. 286 and 287?

[fol. 3954] A. That is correct.

Q. Exhibit No. 289, "Detail of Train Accidents, Road Freight Train Operation," this is the detail of accidents where the damage to equipment was $150 or more?

A. In excess of $150 including the cost of clearing the wreck. When I say equipment, also track. When the equipment property of the carrier and the expense of clearing the wreck exceeds $150, it appears on exhibit No. 289.

Q. I notice on the bottom of sheet No. 7 you have indicated in this exhibit where the accident was caused by sudden stop, start, lurch, or jerk of car or train it is again indicated by a double cross?

A. No, that is not entirely correct. That was not the cause of the accident. That was the cause of the injury to brakeman Hunt. The cause of the accident was a defective knuckle.

Q. There are many other accidents in here than those indicated which involve the sudden stop, start, lurch, or jerk?

A. No, I wouldn't say many.

Q. Well, let's go through this exhibit and see what we have.

A. This exhibit shows 222 items.

[fol. 3955] Q. Take the description of the accident, item No. 9, wouldn't you say that was an accident caused by a sudden stop, emergency application of the brakes due to a dirty triple valve?

A. Yes, that derailment was caused by the air brakes applying in emergency due to a dirty triple valve.

Q. And the damage was the result of that?

A. But there were no injuries.

Q. No. The next item, item No. 10, air hose burst on car, slack running in and breaking car in center, car bulging out toward main track and raking cars in passing pas-

senger trains, causing injury to express messenger in baggage car. That accident caused an injury?

A. That is correct.

Q. You haven't marked that?

A. It should not be. The passenger train was standing still—no, pardon me, it was proceeding at speed and he fell over the moment that the freight cars raked the passenger train.

Q. The cause of the freight car bulging was the slack running in?

A. That is correct, due to an air hose bursting but there was no one injured on the freight train.

[fol. 3956] Mr. Booth: These are all Arizona accidents, aren't they?

A. Yes, sir.

Mr. Mason: These are all accidents which could have been but were not prevented by the 70, or 14-car law, is that the idea?

Mr. Strouss: We will find out about that.

Q. The first one of those was one a 65-car train and the other on a 66-car train?

A. That is correct.

Mr. Mason: The accident was on the 12-car train.

A. No, the accident was on the freight train of 66 cars. The injury was on the passenger train of 12 cars.

Mr. Strouss:

Q. On sheet No. 2, item No. 27, "train parted due to some unauthorized person stepping on cutting lever." That would be due to a sudden stop?

A. Yes, no doubt but what the train stopped, but no one was injured.

Q. $200 damage?

A. That is correct.

[fol. 3957] Q. In item 43,—by the way, that accident was on a 66-car train too, wasn't it?

A. That is correct.

Q. In item 43, "Undesired emergency application air brakes caused break-in-two and pulled end sill and draw-bar out of weak car."

A. That is true, 60-car train, nobody hurt.

Q. $300 damage?

A. That is correct.

Q. Now, item 73, on sheet 3, "Train broke-in-two due to severe slack action caused by improper application of air by engineer."

A. That is correct, $245 damage, nobody hurt, 67 cars.

Q. The next item "Derailment caused by undesired emergency application of air brakes while stopping due to dirty, slow-acting triple."

A. What item was that, Mr. Strouss?

Q. No. 74.

A. That is correct, $290 damage, 67-car-train, nobody hurt.

Q. Item 77. "Air-brakes went into undesired emergency causing car to buckle."

A. That is correct. $200 damage, 65-car train, nobody hurt.

Q. Item 93, "Emergency stop made to keep from running [fol. 3958] through switch which brakeman had not thrown due to his switch key being so worn it would not unlock switch lock."

A. That is correct, 70-car train, $458 damage, nobody hurt.

Q. Now, item 98—that was a 70-car train, that previous item?

A. That is correct.

Q. Item 98, "Slack ran in when air brakes applied in emergency to stop train, damaging 49th and 50th cars from engine."

A. That is correct. 53-car train, $500 damage, nobody hurt.

Q. In item 111, "Undesired emergency application of air brakes due to branch pipe being struck by some object, caused drawbar of car to drop down, resulting in derailment."

A. That is correct, 46-car train, $1,560 damage, nobody hurt.

Q. Item 120, "Cars buckled due to rough stop when airbrakes applied in emergency."

A. $510 damage, 99-car train, nobody hurt. That was a train coming from the Los Angeles division into Yuma.

Q. Item 124, "Engine separated from train due to lock block not feeding properly, air brakes taking undesired [fol. 3959] emergency, derailing two outfit cars on rear of train."

A. 66-car train, $653 damage, and killed a lineman who was occupying one of the outfit cars.

Q. The next item, No. 125, "Train broke-in-two due to trespasser stepping on cutting lever."

A. 67-car train, $325 damage, nobody hurt.

Q. Item 139, "Break-in-two caused by drawbar pulling out of car due to defective bolts in draft rigging."

A. 47-car train, $175 damage, nobody hurt.

Q. Item 175, is that a sudden stop accident? It says, "Car broke-in-two because too weak, due to old defects, to withstand ordinary train usage." I didn't quite understand.

A. That is of the type of miscellaneous train accidents, no derailment occurred but there were 65 cars in the train and this one broke-in-two and was damaged $395.

Q. And the next item, 176, "Emergency application of brakes caused by main reservoir pipe on engine breaking."

A. Yes, that is a 65-car train, $470 damage, nobody hurt. No one was injured in item 175 either.

Q. Item 183, "Six cars buckled and damages due to heavy run-in of slack as result of emergency application [fol. 3960] when branch pipe broke on 34th car from engine."

A. 70-car train, $1055 damage, no one injured.

Q. Item 213, "Train broke-in-two due to defective knuckle on first car."

A. I have discussed that previously.

Q. Oh, yes.

A. That is a sixty-seven car train, injured brakeman, $250 damage.

Q. Item 225, "Engineer applied airbrakes in emergency when middle main rod strap of engine broke, caboose being knocked off center and conductor in caboose injured."

A. Yes, that was a 57-car train, $760 worth of damage and injured Conductor Quint.

Q. 230, "Undesired emergency caused by weak graduating spring and sluggish triple on car pulled drawbar out of second car derailing third and fourth cars."

A. That was a 67-car train, $890 damage, no one injured.

Q. Item 233, "Trespasser stepped on cutting lever of fourth car from engine, sudden stop and severe slack action damaging 63rd, 68th and 69th cars from head end."

A. That was a 70-car train, $165 damage, nobody in-
[fol. 3961] jured.

Q. Item 238, "Derailed 5th and 6th cars from engine due to air hose bursting on 5th car, causing drawbar to pull out of 3rd car and fall on track."

A. That was a 60-car train, $200 damage, no one hurt.

Q. Item 242, "Failure of engineer to properly control slack and weak condition of car caused damage to car just ahead of helper engine."

A. 70-car train, $700 damage, no one injured.

Q. Item 256, "Air hose burst on first car ahead of helper engine cut-in rear of train, causing derailment and buckling of 13th car ahead of helper engine."

A. 70-car train, $1,500 damage, nobody injured.

Q. Item 260, "Train parted when starting, drawbar being pulled out of 34th car due to brakes not being released, center sill and end frame being pulled off the car." Would you class that as that type of accident?

A. It doesn't come within the class you have been reading to me.

Q. We will leave that out. Item 264, "Emergency application of airbrakes due to trespasser stepping on cutting lever with helper engine shoving rear of train buckled
[fol. 3962] 61st car from head end."

A. That was a 68-car train, $200 damage, no one injured.

Q. Item 315, "Second car from caboose buckled due to heavy service application of airbrakes made to stop train when engine struck cow."

A. That was a 53-car train, $400 damage, no one injured.

Q. Item 346, "Three deadhead cabooses on rear of train damaged when emergency stop made to avoid striking another engine."

A. 66-car train, $450 damage, and nobody injured.

Q. Item 349, "Trespasser stepped on cutting lever, parting train, airbrakes going into emergency causing rough stop."

A. $200 damage, 58-car train, nobody injured.

Mr. Mason: I think you have overlooked No. 347. It is marked with the cross-hatch there.

The Witness: Well, the train accident wasn't due to any causes Mr. Strouss has mentioned, but the conductor received his injury on account of sudden stop.

Mr. Strouss: Well, it reads, "Scale car next ahead of caboose derailed and derailed due to up and down mo-
[fol. 3963] tion caused by ballasted weights, breaking train line, sudden stop of train, causing injury to conductor in caboose." That was a 66-car train with $355 damage?

A. That is correct.

Q. Item 367, "Train broke-in-two due to undesired emergency when stopping."

A. 70 cars in train, $402 damages and no one injured.

Q. Item 373, "Conductor applied brakes from caboose because engineer backed up without signal and switch to siding had not been thrown, slack action stopping damaging two cars and causing derailment of one car."

A. Of course, that is distinguished from the other type of accidents, because in this case the train was backing up. In the others, it was going ahead. It was a 65-car train, $180 damage, and no one was injured.

Q. Now, Exhibit 290 is a similar exhibit for Nevada?

A. That is correct.

Q. Now, I would like to go down through this exhibit the same way.

A. I beg your pardon, I would like to request that one item be eliminated which was included through inadvertence, [fol. 3964] and that is item 206.

Q. That is in Arizona, you mean?

A. No, in Nevada. I included in error an accident involving a light engine, which does not conform to the title of the exhibit. It should not have been included and it doesn't affect any of the other exhibits.

Q. The first accident of the type caused from sudden stopping, starting, lurching or jerking of train that I note on this exhibit, and if there are any I overlook that you see, I would like you to call my attention to them, is item 9. "30th car from caboose buckled due to run-in of slack as train was stopping."

A. That was a 97-car train, $400 damage, and no one was injured.

Q. And item 11, "Derailed six cars behind engine, due to coupler pulling out of engine tender and falling on track

caused by emergency action of brakes due to knuckles slipping by between second and third cars ahead of caboose."

A. That was a 55-car train, $1160 damage, and no one injured.

Q. Item 12, "Sudden stop due to undesired emergency as train was stopping in siding, caused injury to brakeman [fol. 3965] in caboose cupola and damaged 26th and 27th cars from caboose."

A. That was an 85-car train, $720 damage, and injured Brakeman G. W. Roberts.

Q. Item 18, "Derailed and buckled 5th and 6th cars from engine and damaged car behind engine due to emergency action of brakes caused by trespasser stepping on cutting lever as train backing in siding."

A. That was during a back-up movement. It was an 87-car train, $178 damage; and no one was hurt.

Q. Item 26, "Train parted as it was being stopped due to drawbar in engine tender falling out on account of carrier-iron breaking. Emergency action of brakes caused damage to seven cars and injured trainmen in caboose."

A. That was an 85-car train, $395 damage, and injured the conductor and two brakemen.

Q. Item 35, "Airhose burst on 7th car from engine. Emergency action of brakes buckled 9th car from caboose."

A. An 84-car train, $530 damage, and no one injured.

Q. Item 46, "Run-in of slack caused the 16th car from caboose to be telescoped by the 15th car."

A. 83-car train, $175 damage, no one injured.

Q. Would you consider item 47 in that type of acci- [fol. 3966] dent?

A. Yes.

Q. "Derailed 38th car from head end due to drawbar falling out of car caused by keeper in drawbar key losing out."

A. It was a 94-car train, $573 damage, no one injured.

Q. Item 48, "Sudden stop due to undesired emergency as train was stopping in yard, buckled 10th and 11th cars from caboose."

A. 84-car train, $375 damage, no one injured.

Q. Item 56, "Derailed 18th and 19th cars ahead of caboose caused by sudden stop due to undesired emergency."

A. 101-car train, $470 damage, no one injured.

Mr. Mason: Did you leave out 52, Mr. Strouss?

Mr. Strouss: Yes, that is right. "Derailed 20th car ahead of caboose due to draft rigging pulling out of car and falling on track when undesired emergency action of brakes occurred, caused by defective triple."

A. That was a 90-car train, $610 damage, no one injured.

Q. I gave you 56, didn't I?

A. Yes.

Q. 57, "Four cars damaged as train being stopped in [fol. 3967] siding due to undesired emergeney."

A. 86-car train, $263 damage, no one injured.

Q. Item 59, "Derailed and telescoped 32nd car from caboose and slightly damaging four other cars, helper engine shoving on rear, when engineer applied brakes in emergency to avoid running over a fireman who stumbled and fell attempting to cross tracks in front of train. Brakeman in caboose injured."

A. 88-car train, $918 damage, and injured the Brakeman Vandermark.

Q. Item 75, "Two cars damaged due to engineer making heavy application of air and not properly controlling slack, and helper engine shoving on rear."

A. 69-car train, $390 damage, and no one was injured.

Q. Item 79, "Derailed and buckled 64th and 65th cars from engine due to emergency action of brakes when train parted due to defective drawbar yoke strap breaking on 10th car from engine."

A. 107-car train, $788 damage, no one was injured.

Q. Item 81, "Derailed 20th and 21st car from engine caused by drawbar pulling out of 16th car from engine and [fol. 3968] falling on track due to draft key losing out."

A. That was a 66-car train, $570 damage, no one injured.

Q. Item 84, buckled 48th car from head end due to weakened condition of car, as train was being stopped to cut out helper."

A. 123-car train, $950 damage, no one injured.

Q. Item 87, "Buckled 70th car from head end due to slack action as train being brought to a stop."

A. 143-car train, $556 damage, no one injured.

Q. Item 88, "Buckled 58th car from engine while stopping in siding due to undesired emergency."

A. 90-car train, $600 damage, no one injured.

Q. Item 91, "Buckled 13th car from caboose due to emergency action of brakes caused by train parting, 4th car from engine, due to drawbar yoke strap breaking. Conductor thrown to floor of caboose."

A. 94-car train, $865 damage, injured the conductor.

[fol. 3969] Q. Item No. 94, "air hose blew off 4th car ahead of caboose, causing train to part between 10th and 11th cars from engine due to broken coupler, damaging 4 cars and injuring brakeman in caboose."

A. 86-car train, $354 damage, injured brakeman Lynch.

Q. Item No. 95, "train parted due to drawbar pulling out of 2nd car from engine; sudden stop damaged 74th and 75th cars from head end and injuring deadhead brakeman in caboose."

A. 88 cars, $200 damage, injured headhead brakeman Wakefield.

Q. Item No. 96, "Derailed and buckled 45th car from engine and damaged 3 other cars, due to improper handling of air by engineer."

A. 50-car train, $886 damage, no one injured.

Q. Item No. 97, "Derailed and damaged 19th to 22nd cars from caboose due to emergency action of brakes when train parted caused by drawbar yoke breaking on 8th car from engine."

A. 100-car train, $3,200 damage, no one injured.

Q. I am putting in a lot of stuff that is already in the exhibit but I think from your testimony in this exhibit and [fol. 3970] the one previous this is the type of accident, of course is the type of accident that is referred to as the type we have read from these exhibits or the type of accident referred to as sudden stop, start, lurch, or jerk of train?

A. No, I tried to make it clear——

Q. (Interrupting) The accident may not have been caused by that but the damage and casualty results from that?

A. It may have been and it may not have been but, as I tried to explain, the Interstate Commerce Commission does not classify train accidents as being due to sudden stop, start, lurch, or jerk of train. It is classified in an entirely different manner according to the primary cause of the accident. The narrative in many of those cases indicates that there was a sudden stop, but in many cases that was not the primary cause of the damage to the equipment.

Q. There was a run-in of slack?

A. There was bound to have been some run-in of slack if the slack was stretched and it was a sudden stop, but if anyone was injured in the caboose by reason of that slack action and it had not been a train accident, it would have been classified as sudden stop, start, lurch, or jerk of train [fol. 3971] but there is a variety of classifications. You will observe in this you have been reading to me some are classified as derailments; one I recall was a collision of one portion of the train with the other after it separated and some are miscellaneous train accidents where damage to the equipment occurred but there was no collision or derailment.

Q. That is the type of accident that is classified by the Interstate Commerce Commission where there is a buckling of a car due to slack running in by reason of a derailment or the train parting, that will take an M-b symbol, wouldn't it?

A. It would if no derailment occurred but if exactly the same type of damage occurred the identical cause with one pair of wheels or one wheel got off the track it wouldn't be classified as a miscellaneous train accident but would be classified as a derailment, and depending on the primary cause the Interstate Commerce Commission would classify the accident if it was due, for instance, to an air hose bursting, there is a code cause providing for the failures of air hose. If it was due to a coupler falling out, a knuckle breaking, or some of the other causes we have read about, the accident would not be classified by the Interstate Com- [fol. 3972] merce Commission as a sudden stop, start, lurch, or jerk, it would be classified under the various primary causes for that train accident. The same code cause, for instance, for a drawbar pulling out would be used whether it was a derailment or a miscellaneous train accident.

Q. In the case of a derailment where damage to the equipment may have resulted from the run-in of slack, they would still be classed as a derailment under the Interstate Commerce Commission classification?

A. It would be classed as a derailment and under the appropriate primary cause for that derailment.

Mr. Strouss: Rather than taking the time of reading this all in, I wonder if you would this evening check over the balance of this exhibit as to this number of accidents similar

to those that have been read in showing the length of trains upon which they occurred and without reading them all in, that information could be had in the morning.

A. Just for Nevada or do you want a comparison between Arizona and Nevada?

Mr. Strouss: We have already read into the record those for Arizona. If I have missed any, I would be glad to have [fol. 3973] you call my attention to it.

A. If you could prepare a question as to just how you want this prepared, I will be glad to do it or I can prepare an exhibit and select it by years, each of those accidents of the type you have read and compare them by years one state with the other.

Mr. Strouss: I can do that without your testifying, I think.

A. If you want that particular type you have been reading, I can list them off the exhibit.

Mr. Strouss: Just to get the number of them but I think it is probably clear in the exhibit itself.

The Court: Are you through for the night?

Mr. Strouss: I think so.

The Court: The court will be at recess until ten o'clock tomorrow morning.

(Thereupon the court stood at recess until 10 A. M., Tuesday, February 18, 1941.)

[fol. 3974] February 18, 1941, ten o'clock A.M.

Proceedings were resumed at this time as follows:

The Court: You may proceed.

JOHN J. SULLIVAN was recalled to the stand and testified further as follows:

Cross-examination (Continued).

By Mr. Strouss:

Q. Mr. Sullivan, your exhibit No. 291, casualties—

A. (Interrupting) I beg your pardon, Mr. Strouss, you requested me just before recess yesterday to continue giving the reference to those particular accidents you were reading from exhibit 290. Do you want me to give you that information now or later? I have checked the items and I

can read the items into the record if you want me to.

Q. Yes, that is all right.

A. Just before the recess, Mr. Strouss was reading from a certain particular type of accident from Exhibit 290, Train Accidents occurring in the State of Nevada and, in response to his request that I give reference to the other [fol. 3975] accidents of a similar kind, I will read into the record the item numbers appearing on exhibit No. 290. The additional numbers start on sheet 4. Mr. Strouss last referred to item 97, and I will continue. Item No. 98, 99; on sheet 5, item 109, 120, 121, 122, 123, 126, 128, 132, 133, 136, 137, 139, 140; sheet 6, 141, 142, 143, 151, 163, 165, 166; sheet 7, 170, 174, 176, 178, 183; sheet 8, 193, 194, 209, 214; sheet 9, 224, 225, 227, 228. In all of these accidents damage in excess of $150 occurred, and in two of them personal injury to employees occurred.

Mr. Booth: May I ask a question, Mr. Strouss, right there?

Mr. Strouss: Yes.

Mr. Booth: These accidents that you have been questioned about by Mr. Strouss are contained on what exhibits?

A. Well, if there were any injuries, they are contained in the series of exhibits which show for Nevada and Arizona, exhibits 276, 277, 278, 282, 283, 284, because those exhibits include casualties both on train and train-service accidents, and those train accidents shown on exhibit 290 are train accidents only and do not include the train-[fol. 3976] service accidents.

Q. You mentioned Exhibit 290. That is the Nevada exhibit, isn't it?

A. That is correct.

Q. And 289 was the Arizona corresponding exhibit?

A. That is correct.

Mr. Booth: I wanted to clear that up in the record that these were not in addition to the accidents already shown.

Mr. Strouss: That is, the ones in which injury occurred.

Mr. Booth: Yes.

The Witness: Mr. Strouss, you also asked me to obtain for you the date that the pair-track operation in Nevada

was made effective. The information I have is that the date is August 1, 1924.

Mr. Strouss: I also asked you to bring in the form T on the accident at Arlington.

The Court: Did I understand your last answer, Mr. Sullivan, to be that you started the use with the Western Pacific of this section here from Weso to Alazon in August, 1924?

A. From Weso to Alazon on August 1, 1924, the last time, but it was operated in a similar manner under fed-
[fol. 3977] eral control during the war.

Mr. Strouss: I would like to have you read into the record the statement on the form T of the accident which occurred at Arlington, Arizona, on the 30th day of July, 1939, giving the statement of the cause, and then the statement of detail of cause, nature of circumstances of accident.

A. Reading from sheet No. 92 of the monthly report of railway accidents of the Southern Pacific Company to the Interstate Commerce Commission for July, 1939; the injury occurred at Arlington, Arizona, July 30, 1939. The cause, briefly, under item 17, "brakeman either thrown or fell down in caboose." It was local freight train No. 902, consisting of 59 cars and covers the injury to R. A. Green, a local freight brakeman who suffered a fracture of the twelfth rib, left side. Detail of cause under item 26: "After setting out bad order car at Arlington and getting ready to depart, conductor got on caboose and found rear brakeman Green lying on caboose floor in an unconscious condition. Later on, being questioned as to how accident occurred, Green could remember nothing other than seeing conductor give engineer stop signal going through siding at Arlington; he got down out of caboose cupola to get his red lantern hanging on nail in caboose, everything being
[fol. 3978] obscure to him until found himself lying on the cushions on caboose floor, he having been placed on same by the conductor."

[fol. 3979] Q. Now turning to exhibit No. 291, "Casualties to All Classes of Persons, Except Trespassers, Train and Train Service Accidents While on, Employed on, or Getting on or off Passenger Trains, Reportable to the Interstate Commerce Commission, State of Nevada,

Southern Pacific Company Lines, 1923 to 1939." This includes both main line and branch?

A. Yes, but I don't recall of any injuries to passengers on any branch lines in this exhibit, but if there were any it will show.

Q. There was a change in the territory during the period covered. I mean in the first year and a half you were operating single track and didn't have the paired track arrangement with the Western Pacific?

A. No, not until August 1, 1924.

Q. Do you know that in 1923 and 1924 the branch line operations in Nevada were approximately 200 miles longer than in the last years of this period, isn't that a fact?

A. I don't think it is a fact as to passenger train operation. Possibly as to the physical characteristics of the railroad there would be some difference, but I will be glad to answer that question definitely this morning. I am hav-[fol. 3980] ing a statement prepared showing the operated mileage both in the state of Nevada and Arizona as of December 31st for each of the years from 1923 to 1939, inclusive.

Q. That is for both freight and passenger train operation?

A. It won't show it separately for freight and passenger train operation.

Q. This exhibit is a trend exhibit again, isn't it?

A. No, not altogether.

Q. This type of casualty is more or less irregular, that is, it is up one year and down another?

A. That is true, but as to Nevada my reference to sheets Nos. 2, 3, and 4, which are part of the exhibit, it also shows they are quite infrequent.

Q. It also shows, omitting the Harney derailment, there has been very little change in the last few years?

A. What change there has been is reflected in the casualty rates on sheet No. 1, columns A to X, inclusive.

Q. And that shows there has been very little change in the last two years?

A. No, I wouldn't say that; it shows fluctuation.

[fol. 3981] Q. You mean from year to year?

A. Different years, yes. In other words, there isn't any definite trend, for instance, reference may be made to 1938 which would eliminate the Harney derailment, cas-

ualties to all persons per million train-miles was less than one, whereas the preceding year it was four times that many. The year before that it was somewhat more than that, but in the year 1935 there was none but the exhibit shows the casualty rates and the fluctuation.

Q. It does fluctuate from year to year?

A. Yes.

Q. In these accidents which you have detailed, there appear to be four which were injuries caused by slack action, one on the 23rd day of May, 1932, at Cobre?

A. No, I wouldn't say that was due to slack action.

Q. It was due to a sudden stop of the train?

A. No, there is nothing there that said it was due to a sudden stop. It might have been due to the motion of the train. There is nothing on the exhibit to indicate it was due to slack action and I have no knowledge that it was.

Q. Do you have that form T available?

[fol. 3982] A. Yes, I have a photostatic copy of it.

Q. I would like to have it. What about the one on March 8th, 1937, item No. 47?

A. According to the detail, that was due to a jerk of the train, on a 12-car train.

Q. And the next, item No. 48?

A. That is correct, on a 13-car train.

Q. The next exhibit, No. 292, is a similar exhibit only applying to Arizona?

A. That is correct, except there is additional information shown on sheet No. 2 that does not appear on exhibit No. 291.

Q. Yes, there is a comparison made there of the two exhibits?

A. That is correct.

Q. Now in this exhibit, item No. 4, that is the result of slack action, isn't it?

A. No, more than likely it was due to some lateral motion of the baggage car in which the express messenger was working.

Q. How about item No. 11?

Mr. Booth: What is that item No. 4, Maricopa, 1923?

A. I understood him to say item No. 5.

Mr. Strouss: No, elderly passenger rolled against seat as train recoupled after making pickup.

[fol. 3983] A. That is a switching accident, a case where apparently the engineer coupled the train too hard and this elderly passenger was thrown against the seat but it was not any slack action of the train.

Q. Coupling at the station in putting the car in or something of that sort?

A. Yes, during that period Maricopa was the junction point of the Phoenix line and certain trains picked up and set out passenger equipment at Maricopa and this accident apparently according to the narrative occurred during that operation, which was a switching operation pure and simple.

Q. What about item No. 11?

A. That was an 8-car train, due to a sudden stop.

Q. Item No. 86?

A. Yes, that was an accident that resulted allegedly from a jerk when the train was stopping, a 14-car train.

Q. Item No. 99?

A. That was a passenger injured by an emergency stop on an 11-car train due to oversight on the part of the engineer in charge of the train.

Q. It was slack action, wasn't it?

A. Unquestionably.

Q. Item No. 136?

[fol. 3984] A. Yes, that was a jerk as the train was being started, a 14-car train.

Q. Item No. 138?

A. Yes, a 13-car train.

Q. Item No. 157?

A. Considering the speed, I would say that was some lateral motion of the car and not slack action.

Q. What about item No. 162?

A. Yes, that was a jerk of the train, a 5-car train.

Mr. Mason: It was a 12-car train, wasn't it?

A. That is right, the number was five; it was a 12-car train.

Mr. Strouss: Item No. 187?

A. Yes, 14-car train.

Q. No. 188?

A. 14-car train, when starting.

Q. No. 195?

Mr. Booth: You don't mean that is slack action, do you?

A. It was attributed to a jerk.

Mr. Booth: There is a whole lot of difference between a jerk and slack action, isn't there?

A. You don't have a running in or running out as you are starting the train, it is a jerk.

Mr. Strouss: Your classification is "sudden stop, start, [fol. 3985] lurch, or jerk of train."

Mr. Mason: Do we understand that you contend that sudden stop, start, lurch, or jerk and slack action are absolutely and inevitably synonymous?

Mr. Strouss: No, I don't contend that.

The Witness: I was answering Mr. Strouss in response to his question as to the cause assigned. There is nothing on the exhibit assigning them to any particular cause, the narrative is there and speaks for itself.

Q. What about No. 196?

Mr. Mason: I don't think there was any answer on No. 195.

A. It was due to an alleged jerk of an 11-car train.

Mr. Strouss: Did you answer No. 195?

A. I am just answering that now, on an 11-car train. That was a case of one passenger stepping on the foot of another.

Q. No. 201?

A. That was due to rough stop on account of grade crossing accident, 12-car train.

Q. No. 208?

A. That was an 11-car train, alleged to be due to a sudden stop of the train.

Q. No. 218?

[fol. 3986] A. No, there is no evidence there that that was due to any jerk.

Q. It was No. 219 I meant.

A. Considering the speed of the train, more than likely that was some lateral motion of the car and not a jerk horizontally.

Q. The exhibit indicates it was due to a lurch of some sort?

A. Yes, that is correct. The reason I mentioned the difference between the horizontal and the lateral is because you can have a lateral motion of the car regardless of the number of cars in the train.

[fol. 3987] Mr. Strouss: Now, there is one further question in connection with this exhibit, item 104, derailment at Dome. Some point of this accident was made in your direct examination. I want to ask you if it is not a fact that the locomotive which was pulling this train at that time afterwards turned over, if you know?

A. It turned over in this accident.

Q. But in subsequent operation, didn't it again turn over this same locomotive, if you know?

A. Possibly I can answer that. I have a copy of that Dome accident report.

Q. I don't mean in this particular accident, I mean afterwards.

A. Well, that is the only way I can determine it. This was locomotive No. 3122. Well, I have examined the exhibit covering passenger train accidents, and the freight train accidents, because if the engine turned over it would be a reported train accident, and I don't find where it turned over subsequently. The report of the accident happening at Dome shows it occurred to through passenger train first 104, three cars in the train, engine 3122; report states that train No. 104 arrived Yuma August 5, [fol. 3988] 1931, with fifteen cars and with the regular San Diego-New Orleans sleeper to pick up made a total of sixteen cars, making it necessary to run two sections Yuma to Phoenix account car limit law; first 104 consisting of engine 3122, baggage cars S. P. 6454 and S. P. 6472 —I don't know whether you want all that read. It mentions engine derailed to the left on outside of curve, first marks of detailment being abrasions on west end of angle bar on outside of north rail, next mark on one of the bolts of the same joint. It is a long narrative.

Mr. Strouss: I think the summary is all that is necessary.

The Court: The entire summary is already in there.

The Witness: But I can't find any reference to the engine subsequently turning over and I have no knowledge of it having turned over.

Mr. Strouss: Your exhibits, 293 and 295, are similar to exhibits 291 and 292, except that they relate to April—exhibit 294 to March and April, 1940, and this is a passenger train exhibit.

A. Yes, Exhibit 294 is a passenger exhibit for the months of March and April, 1940.

Q. And 295 is the freight exhibit?

[fol. 3989] A. That is correct.

Q. Were operations conducted in the usual manner during those freight train operations?

A. I wasn't here, but I presume that they were.

Q. You don't know whether there were any changes in the way they handled trains coming into Tucson, for example, those long freight trains?

A. No, I don't know how the physical handling was undertaken.

Q. Whether they came down and instead of pulling into the yard in the ordinary practice, stopped and sent an engine out to help them in?

A. I don't know, but when I was employed on the Tucson division that was the regular practice to send the engine down to pull them in.

Q. You don't know whether there were any changes made during this period from what it had been just prior to that?

A. No, but I presume that their practice was undertaken in the same way.

Q. Your exhibit 293 has to do with grade crossing accidents in Arizona?

A. Yes, that is correct.

Q. And Arizona only, comparing the accidents on the Southern Pacific——

[fol. 3990] A. Yes.

Q. ——with those of other railroads?

A. No, there is no comparison with other railroads.

Q. I mean separating those on your railroad from those on other railroads?

A. Yes, that is correct.

Q. What was the number of the other crossing exhibit, do you remember, the grade crossing exhibit?

Mr. Booth: The national exhibit.

A. Exhibit 268 covers the national showing.

Mr. Strouss: Now, these tables from which these two exhibits were made, those tables show the casualties by states, do they not, in the accident bulletin?

A. Yes.

Q. So that it is possible from those to make a comparison of accidents occurring in different states if that is desired.

A. If that is desired, yes.

Mr. Strouss: I think that is all. You will have that mileage?

The Witness: It should be here now, but I will have it for you.

Mr. Strouss: I am expecting some certified copies that [fol. 3991] I mentioned yesterday of reports that I will want to put in, in addition to the ones put in yesterday.

Mr. Booth: I notice at page 3907 of the record, when we spoke of substituting exhibits showing the 1939 I. C. C. figures, that the Court said, "There may be substituted in this record for these various national exhibits that have to do with this safety angle an exhibit which will bear the same number," and so forth. There are some Southern Pacific System exhibits which were taken from the reports, which we would like to substitute.

The Court: It was my understanding, Mr. Booth, that when you came to the showing of the Southern Pacific System, that this witness Sullivan did include in his exhibit the 1939 statistics, but that it was only in the national set of statistics that the 1939 was excluded.

The Witness: That is only partially correct, your Honor. There were two exhibits, the source of which was the Interstate Commerce Commission Accident bulletins and they didn't include the year 1939.

Mr. Strouss: I will say to the Court that I have no objection to the substitution in any exhibit where the exhibit [fol. 3992] was made up from the accident bulletin, whether it be national or for the Southern Pacific line. In saying that, I don't waive any objection I made to the introduction.

The Court: I understand that. The Court will broaden the scope of its order, and permit you on any of these exhibits having to do with the safety angle where the 1939 statistics were not available, they may now be added to the exhibits.

The Witness: I might mention, that the exhibits I have just referred to are exhibits 272 and 273.

Redirect examination.

By Mr. Booth:

Q. Mr. Sullivan, which of your exhibits gives the number of train accidents on all railroads of the United States for the year 1938 and years preceding?

A. Exhibit No. 269, train accidents and resulting casualties, all railroads of the United States.

Q. What was the number of train accidents from all causes, as shown on that exhibit 269, for the year 1938?

A. 5,682.

Q. In what table in the accident bulletin 107 for the year [fol. 3993] 1938 is that figure found?

A. Table No. 61.

Q. In what table in the accident bulletin No. 108 for the calendar year 1939 was the corresponding figure found?

A. It may be found in more than one table. Table No. 61 and table No. 63, table 61 having the title, "Train Accidents Showing By Classes Number of Accidents, Damage to Railway Property, and Resulting Casualties to Persons for the Year Ending December 31, 1939." Table No. 63 has the title, "Train Accidents Showing by General Classes and Causes Number of Accidents, Damage to Railway Property, and Resulting Casualties to Persons."

Q. What was the number of train accidents from all causes, all railroads in the United States, as shown by table 63 for the year 1939?

A. 6,074.

Q. Then there was an increase of 392 in 1939 as against 1938, is that correct?

A. That is correct.

Mr. Booth: I have asked the witness, your Honor, to prepare some figures breaking down this increase because to put in an amended exhibit, or rather a supplemented exhibit without any explanation would simply show the [fol. 3994] fact of an increase without showing what caused it, and I don't want to put it in in the form of an exhibit. I will ask the witness to read the figures into the record.

Q. Into what general groups are train accidents divided?

A. As to kind or causes?

Q. As to cause, four general groups.

A. Reference may be made to table No. 63, items 22 to 25, which shows first, negligence of employees; second,

defects in or failures of equipment; third, defects in or improper maintenace of way and structures; and, fourth, miscellaneous.

Q. The assigned causes of negligence of employees increased from what number to what number, 1938 to 1939?

Mr. Strouss: May I ask, are these just reading the figures from the accident bulletin?

Mr. Booth: Yes.

A. Table No. 63 on both accident bulletins 107 and 108 for the years 1938 and 1939, shows that the train accidents chargeable by the Interstate Commerce Commission to negligence of employees increased from 1,772 in 1938 to 2,238, or an increase of 466 or 26.3 per cent.

Q. Was there a decrease in accidents caused by defects [fol. 3995] in or failures of equipment, and, if so, to what extent?

A. Yes, train accidents due to defects in or failures of equipment decreased from 2,073 in 1938 to 2,039, in 1939, a decrease of 34, or 1.64 per cent.

Q. And what as to the next general cause?

A. Train accidents due to defect in or improper maintenance of way and structures decreased from 720 in 1938 to 709 in 1939, a decrease of eleven or 1.53 per cent.

Q. And miscellaneous causes?

A. Miscellaneous causes decreased from 1,117 in 1938 to 1,088 in 1939, a decrease of 29 or 2.6 per cent.

Q. Now, will you give the grand total, please?

A. Train accidents from all causes increased from 5,682 in 1938 to 6,074 in 1939; an increase of 392, or 6.9 per cent.

[fol. 3996] Mr. Booth:

Q. Mr. Sullivan, in any of your other exhibits about which Mr. Strouss questioned you on cross-examination, is there any showing of the percentage of accidents charged by the Interstate Commerce Commission to negligence of employees and, if so, will you state what exhibits they are and what the percentage is?

A. Exhibit No. 270, which is a tabulation of the data shown in the summaries of accident investigation reports insofar as they relate to accidents involving road freight trains, on page 2 negligence of employees was assigned by the Interstate Commerce Commission as the cause of 62.2

per cent of the accidents investigated for that twelve years. Examining the lower block for the year 1939 and making the calculation; it will be found that the number of accidents attributed to negligence of employees was 64.7 per cent or 2.5 per cent higher than the average for the twelve years including 1939. Exhibit No. 271, which is a similar exhibit for passenger trains but for a shorter period, it only covering six years, the average showed that 48.3 per cent of the accidents investigated was chargeable to negligence of employees, whereas for the year 1939, 61.3 per cent was [fol. 3997] charged by the Interstate Commerce Commission to negligence of employees, or 13 per cent more than the average for the whole six years.

The Court: Mr. Sullivan, referring to defendant's exhibit No. 269, line 18, column K, as to the number of train accidents resulting in casualty. What is the 1939 figure that is comparable to the 427 shown on that line? What I am getting at is this, the number of train accidents from your testimony just given apparently increased by some 392. Was there a corresponding increase in the number of accidents resulting in casualties?

A. There was an increase of eight; summary No. 216, the source of column K on exhibit No. 269, shows for the year 1939 there were 435 train accidents resulting in casualties, and as I explained in my direct testimony when I was examined on exhibit No. 269 this particular showing includes trespassers.

Mr. Booth:

Q. Yesterday Mr. Strouss introduced plaintiff's exhibit No. 304 consisting of a certified copy of a report of the Director of the Bureau of Safety of the Interstate Commerce Commission as to the accident occurring November 19, 1938, at Reno, Nevada, on the lines of the Southern Pacific Company. How many brakemen were in the caboose [fol. 3998] of that train at the time of the accident, Mr. Sullivan?

A. Four.

Q. Was that a through freight train?

A. It was, consisting of 85 cars.

Q. Made up where?

A. Sparks, Nevada.

Q. Was it eastbound or westbound?

A. Westbound.

Q. The full-crew law in Nevada is already in evidence here and four brakemen is a larger number of brakemen than that law requires. Why, if you know, were there four brakemen in the caboose of that train?

Mr. Strouss: I object to it as immaterial.

The Court: Objection overruled, you may answer.

A. The Nevada full-crew law requires a conductor and three brakemen. Had the provisions of the Nevada law been in effect on this particular train, there would have been a conductor and two brakemen in the caboose, not exceeding two brakemen, instead of four. The provisions of the California full-crew law must be observed because it is the nearest terminal to the California state line, and the number of additional brakemen required by the law [fol. 3999] are assigned to the crew leaving Sparks, Nevada.

The Court: You mean that the requirements of the California law are in excess of that of the Nevada law so far as the full-train crew is concerned?

A. That is true, your Honor, in fact there are trains that have twice as many brakemen out of Sparks than are required by the Nevada law in a train moving eastward.

Mr. Mason: Where would this train have entered California?

A. At a point known as Calvada, I don't recall now, it is a short distance from Sparks, Nevada.

Mr. Booth: It is about 14 miles?

A. Relatively that, I was going to say 15 miles.

Mr. Mason: How far would the train run in California before reaching the next division terminal?

Mr. Strouss: I object to that, if the Court please, that is certainly immaterial.

The Court: Yes, objection sustained.

Mr. Booth: Counsel brought out this accident and we contend that unnecessary brakemen in the caboose increases the hazard just as unnecessary trains run.

[fol. 4000] The Court: I don't see that that has any materiality here.

Mr. Strouss: You are not asking me to take on the defense of the California full-crew law in this case, too, are you?

The Court: No, I will sustain the objection.

Mr. Booth: You put your finger on that accident:

Mr. Strouss: I have a few more I am going to put my finger on, too.

Mr. Booth:

Q. You had some discussion with Mr. Strouss yesterday about the statistical computation of grade crossing accidents and their hazards in which you said that the statistics indicated a very close relationship of the accidents to the volume of traffic across a crossing. Will you take the 1939 accident bulletin of the Commission, bulletin No. 108, and read what the Commission says with regard to the difficulty of accurate and illuminating statistics on the subject of grade crossing accidents?

Mr. Strouss: I object to that as incompetent, irrelevant, and immaterial, and calling for conclusions.

Mr. Booth: It is the Commission's explanation of its own statistics.

[fol. 4001] Mr. Strouss: Nevertheless, I don't see it is competent evidence here.

The Court: Read the question, please.

(The question was read by the reporter.)

The Court: I will overrule the objection and we will take our morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows:)

Mr. Booth: I am handing the reporter a typewritten tabulation consisting of one sheet which I would like to have marked for identification.

The Court: It may be marked.

The Clerk: Defendant's exhibit No. 305 for identification.

Mr. Booth:

Q. Mr. Sullivan, referring to defendant's exhibit No. 305 for identifictaion, have you had prepared from the reports of the Southern Pacific Company to the Public Service Commission of Nevada and to the Corporation Commission of Arizona a tabulated statement showing the main track

mileage by main line and branch line as of December 31st of each year from 1923 to 1939, inclusive, in those states?

A. I have.

Q. Is that defendant's exhibit No. 305 for identification?

[fol. 4002] A. Yes, sir.

Q. Do you believe it to be true and correct?

A. Yes, sir.

Mr. Booth: Any questions?

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 305.")

Mr. Booth:

Q. Will you read the excerpt from the Interstate Commerce Commission report about which I asked you just before recess?

Mr. Strouss: I renew my objection.

The Court: Objection overruled.

A. Reading from Accident Bulletin No. 108 of the Interstate Commerce Commission, Bureau of Statistics, at page 11, under the caption, "Highway Grade Crossing Accidents," the report states: "To accurately measure the trend in accidents at crossings of railways and highways, it would be necessary to know the volume of traffic, both rail and highway, that passes over these crossings. In the absence of such data, casualty rates based on train-miles, automobile registration, and gasoline consumption in the period 1930-1939 are shown in the table 16 to throw some light on the factor of volume of traffic."

[fol. 4003] Mr. Booth:

Q. Mr. Strouss asked you a question as to whether if a brakeman was injured in operating retainers by a sudden stop, start, lurch, or jerk of train it would be classified under any of the heads shown in the note to your exhibit No. 266, and that was the first time the word "retainer" had come into the case. What is a retainer?

A. A retainer is a device which is a part of the air brake mechanism and it is located at an accessible place on the end of the car near the top, which when manipulated

retains cylinder pressure in the cylinder after the brakes have been released by the engineer in order to keep the brakes applied on the cars on which the retainer might have been manipulated while the brake pipe is being recharged from the engine.

Q. Is it manipulated or operated by hand?

A. It is.

Q. By the brakemen going to the point where the retainer is located and using his hand to turn it?

A. That is true, and it is only operated of course descending certain specified grades.

The Court: Under what circumstances would it be used? [fol. 4004] A. A retainer is used, your Honor, depending upon the average weight per operative brake in the train and depending upon the severity of the grade. Ordinarily retainers are used on the heavier trains, that is, where the weight per car exceeds a certain figure and on grades of 1.4 and more. The two factors must be present, grade descending and weight per operative brake. For example, a train of empty cars descending a 1.5 per cent grade, it would not be necessary to use retainers, whereas if that was a train, for instance, of solid loads exceeding a certain specified gross weight per operative brake or per car, retainers would be used on a certain number of the cars, not on all cars in the train.

Mr. Booth:

Q. What is the rule or practice on the Southern Pacific Company with regard to turning retainers up or down while the train is in motion?

A. They are turned up and down in motion usually at reduced speed.

Q. If a brakeman is injured by a sudden stop, start, lurch, or jerk of a train while he is operating a retainer, under what classification in the Commission's rules for classifying accidents would that accident fall?

[fol. 4005] A. Depending upon the primary cause so-called of the shock or sudden stop, start, lurch, or jerk; it would be classified under either Code Cause No. 7006, 7008, 7009, or 7810.

Q. Mr. Strouss asked you a number of questions about a class of accidents which he called "slack action" accidents, most of which related to injuries to conductors and

brakemen while in the caboose of the freight train. Referring now to train service accidents alone, under what classification or classifications would accidents of that character be classified under the Interstate Commerce Commission's rules?

A. Depending upon the primary cause of the accident, it would be classified under one of the four code causes, 7007, 7008, 7009, or 7010.

Q. Mr. Strouss asked you some questions yesterday regarding Code Causes Nos. 7000, 6411, and 6736. Why did you not include Code Cause No. 7000 in defendant's exhibit No. 266?

A. Any accident that might have been due to sudden stop, start, lurch, or jerk of train in no case would have been included under No. 7000. If it was due to a sudden stopping, starting, lurch, or jerk of locomotive and the cause was not known, it would have been included under No. [fol. 4006] 7007, which is the miscellaneous code cause for that particular type of casualty.

Q. And that No. 7007 is included in exhibit No. 266?

A. It is.

Q. As to No. 6411 and No. 6736, have you taken exhibit No. 266 and made computations on that exhibit so as to show what the averages on that exhibit would be if those causes were included for the entire period 1923 to 1938, inclusive?

A. I have.

Q. Referring to line 20 of that exhibit, the grand total of employees killed was 90. What would the total be if the two classifications I have last mentioned were included?

A. If the fatalities included in Code Causes Nos. 6411 and 6736 for the seventeen years had been included, the number would have been 95 instead of 90.

Q. The persons injured for the seventeen years were 17,302 according to exhibit No. 266. What addition would be made in the case of that figure by including these two additional classifications?

A. The figure would have been 18,789 instead of 17,302, I made an error in the addition and that would change the [fol. 4007] rate and I would like to defer giving those rate figures.

Q. Until this afternoon?

A. Yes.

Q. Mr. Strouss asked you several questions regarding the changes in mileage operated in Nevada and Arizona during the different years included in these casualty statistics. Are your tables for those two states constructed on any mileage or territorial basis?

A. No, they are not related to the road mileage operated in any way.

Q. What are they related to?

A. Depending upon the exhibit, either the total locomotive-miles, car-miles, train-miles, and in one of two instances man-hours worked by a particular class of employees which the exhibit covered.

Q. Will you turn to exhibit No. 268, please, the grade crossing exhibit?

A. Yes, as reflected by the statistics of the Interstate Commerce Commission and covers the United States.

Q. Mr. Strouss asked you a number of questions regarding the elimination of grade crossings by overpasses and underpasses. Will you look at this exhibit and say whether [fol. 4008] those eliminations, no matter how extensive they may or may not have been, seem to have had any appreciable effect on the rate per million train-miles of grade crossing casualties?

A. Examination of the exhibit year after year will show that the casualty rate related to the volume of traffic measured by train-miles has remained reasonably constant. The full figure running along with two exceptions around six or seven casualties per million train-miles.

Q. You said "volume of traffic." Do you mean volume of trains or volume of traffic?

A. Volume of traffic measured by train-miles.

[fol. 4009] Q. In connection with a number of your exhibits, Mr. Strouss asked you as to relative improvements from 1930 on; if you started those exhibits from 1930, would they exclude any significant period, and, if so, what?

A. If the exhibits started at 1930, it wouldn't have been shown, as do the exhibits as prepared, the heaviest periods of traffic preceding the depression, and wouldn't have included a showing of extremely heavy traffic and extremely light traffic and the intermediate periods of average traffic. It wouldn't have included a period with which a comparison could have been made of predominant short train operation in Nevada for the period 1923 to about 1926.

Q. Take your exhibit 262, please. The car-mile figures for Class 1 railroads in the United States shown in column B are the same in all of the exhibits, are they not, where those figures are given?

A. Where total car-miles is given for all traffic.

Q. What was the heaviest year in this exhibit in total number of car-miles?

A. The year 1929.

Q. 33,828,943,000?

[fol. 4010] A. That is correct.

Q. What was the lightest year?

A. The year 1932, with 20,350,867,000.

The Court: Mr. Sullivan, getting back to the grade crossings for a moment, I believe the testimony in this case shows that the main line mileage in Nevada and Arizona is practically the same.

A. The main track mileage, that is correct.

Q. And that, generally speaking, the volume of traffic in the two states is quite comparable, that is, the car-miles. I believe the record further shows that the number of grade crossings in the state of Arizona is probably double that that it is in the state of Nevada.

A. It is considerably more.

Q. Would the fact that we have twice as many grade crossings in this state in your opinion tend to account in part at least for the increased number of casualties and accidents in the state of Arizona as compared to the state of Nevada?

A. In my opinion, the number of grade crossings is not a factor to the extent that the number of vehicles using the crossings and the number of train movements over those crossings is concerned, because if you have in any state an [fol. 4011] innumerable number of crossings and they are not used, there wouldn't be any accidents, but if you had only half the number of crossings but four or five times the vehicle traffic passing over those crossings, you could expect the number of accidents to increase in the same proportion as the number of vehicles using the crossings, assuming that the number of train units were the same in both cases.

Q. But, now, if these crossings were not used they would be abandoned, wouldn't they?

A. That would depend; there are a number of crossings that are not used that have to be maintained on account of deed conditions, the fact that they are dedicated crossings.

Mr. Strouss: I think that is more or less of a legal conclusion, that answer.

The Court: Well, that last part may be.

The Witness: I know of my own knowledge that crossings exist on the Southern Pacific that are rarely used, and participated in personal checks of the traffic over the crossings, nevertheless, the crossings are still maintained.

The Court: But the company does maintain certain safeguards at these crossings where the traffic is heavy that [fol. 4012] you don't maintain on these crossings that are isolated and seldom used, isn't that true?

A. That is correct.

Q. Hence, theoretically at least, if you reduce the number of grade crossings, would you not thereby be in a position to more easily safeguard the traffic that was crossing the tracks and thereby eliminate a number of accidents?

A. I don't think so, because statistics show and the experience of the Southern Pacific shows that, notwithstanding every form of protection, including gates, wigwags, illuminated signs, grade crossing accidents continue to occur at the busy crossings.

Mr. Booth: What, in your opinion, is the best method to reduce the grade crossing hazard, in so far as the railroad can control it?

Mr. Strouss: I object to that as calling for a conclusion.

Mr. Mason: Well, it is following right along the lines of the Judge's questions.

Mr. Strouss: I don't think it is. The Judge has asked about conditions, but his opinion as to improving those conditions, I think is going too far.

The Court: Well, I will sustain the objection.

[fol. 4013] Q. Well, Mr. Sullivan, does your company go this far, that if an application were made for a grade crossing, you feel that that is no concern of yours, no occasion to object to it, you would be willing to have just as many grade crossings constructed as they might want?

A. No sir. From a safety standpoint, I have participated in hearings and offered testimony in opposition to the open-

ing of additional grade crossings where we felt or where I felt that the convenience of the public was adequately served.

Mr. Booth: Do you find in the 1939 accident bulletin any segregation of the number of grade crossing accidents as between city crossings and country crossings?

A. I think there is some reference.

Q. There was in a former bulletin, but I couldn't find it in there. (handing document to witness).

A. The accident bulletin for 1939 makes an analysis along different lines and they make no reference apparently as to the accidents in the cities and the rural districts as they have in previous bulletins. They go into a considerable analysis of the grade-crossing accidents, which cause con- [fol. 4014] siderable damage to property and the hazards resulting from collisions of motor vehicles hauling gasoline. I can find no reference to the segregation as between the rural and the city crossings.

Mr. Booth: I have just about concluded. I may have a few more questions. I would like to consider them at the noon recess, if the Court please. Mr. Mason has some notes that he would like to question about.

The Court: Any objection to Mr. Mason examining?

Mr. Strouss: No.

Mr. Mason: Mr. Sullivan, I just have this note with reference to exhibit No. 274. Mr. Strouss, in his questions, commented upon the fact that according to his check a substantial number of the particular accidents which he picked out occurred on trains of lengths between 67 and 70 cars. The record would show just what percentage he had figured out. Now, I will ask you to refer to defendant's exhibit 214, which is a showing and check of operations according to train lengths, at least in the actual column for the Tucson division during the months of June and August, 1938, and you will note from that exhibit that 85 per cent, [fol. 4015] approximately, of the trains between Yuma and Lordsburg fell in the bracket 61 to 70 cars. Is there anything remarkable, then, in the fact that a large proportion of the accidents occurring on trains would be on trains of between 60 and 70 cars?

Mr. Strouss: I object to that question.

The Court: Objection sustained.

Mr. Mason: Mr. Sullivan, do you find in the figures on that exhibit any possible explanation of the circumstances to which Mr. Strouss called your attention?

A. The type of accident to which Mr. Strouss called attention are infrequent in occurrence——

Mr. Strouss: Now, that is not responsive to the question.

Mr. Mason: I think he should be allowed to make an explanation.

The Court: The objection is overruled.

A. When accidents occur, they will be found, from my experience, in the group of trains that predominate. If the trains are in the group of from 60 to 70 cars, it can naturally be expected that the accidents will be found in that group.

Mr. Mason: They don't occur on trains that don't run?

[fol. 4016] A. That is correct.

The Court: They didn't have any accident on the redispatched operations, did they?

Mr. Mason: I think, your Honor, they assigned them to the trains.

Q. Now, again, in exhibit 275, Mr. Strouss found quite a number of accidents, he said, on trains of more than 70 cars. Will you refer, please to exhibit 198, and I call your attention to the fact that the recapitulation at the foot of that exhibit shows that between Sparks and Carlin, Nevada, 72.4 per cent of the trains, and between Carlin, Nevada, and the Nevada-Utah line, 88.4 per cent of the trains were over 70 cars. Do you find in those figures any explanation of the incidence of the accidents in trains of over 70 cars in the state of Nevada.

A. The accidents, infrequent in number, when they do occur, are to be found in the predominant train operation. If the trains of seventy cars or more predominate, that is where the accidents can be found. As to the operation in Nevada, I had supervision over the operations in Nevada during the years 1935 and 1936, and the operation of trains of less than 70 cars was very unusual.

Mr. Strouss: I move that that be stricken as not re-

[fol. 4017] sponsive to the question.

The Court: Yes, it may be stricken.

Mr. Booth: I will ask him the question. During 1935 and 1936, when you testified in qualifying that you had supervision as an assistant superintendent in Nevada, was it or was it not unusual to run a freight train of less than seventy cars?

Mr. Strouss: I object to that as calling for a conclusion, and not the best evidence.

The Court: The objection is overruled. He may answer.

A. It was unusual to operate freight trains of seventy cars or less.

Mr. Booth: May we adjourn at this time?

The Court: Yes, we will take our noon recess. The court will be at recess until two o'clock.

(Thereupon the court stood at recess until two o'clock P. M. this day.)

[fol. 4018] February 18, 1941, two o'clock P.M.

The witness, John J. Sullivan, was recalled to the stand and proceedings were resumed as follows:

The Court: You may proceed. Have you finished with Mr. Sullivan?

Mr. Mason: There are two or three questions.

The Court: All right.

Mr. Mason: Mr. Sullivan, in connection with your testimony on the exhibit showing the grade-crossing collisions, I think you used the term "volume of traffic as measured in train-miles." I will ask you whether the train-miles are more accurately a measure of some other characteristics of railroad transportation than volume of traffic?

A. Yes, train-miles are more properly a measure of train density, and car-miles a measure of traffic.

Q. Now, referring back to exhibit No. 266, I think that at the adjournment before luncheon you were about to read into the record the figures as they would appear if that exhibit were modified to include code causes No. 6411 and 6736 in addition to code causes 7007 to 7019, inclusive, of table No. 89 of the annual accident bulletins. Have you those figures now in corrected form?

[fol. 4019] A. I have.

Q. Now, without going into the individual years, what would the total be for the years 1923 to 1928, as that total appears in line 7 of exhibit 266 for killed and for injured, and for both killed and injured?

A. If you will permit me to make one correction. As I was reading the figures, I discovered that I had made an error in calculation on column 20 and had stated that the number of killed should have been 95 instead of 90.

Q. That is for the entire period?

A. The entire period. The correct figure is 118 instead of 90.

Q. You would show 118 if you included the other two code causes where you now show 90?

A. Yes.

Q. Going to line 7, will you give the total for the six code causes which would replace the figure 53?

A. On line 7 under column D, where the figure "53" appears, it would read "66."

Q. And in column E?

A. In column E the figure 10,701 would read 11,515, and the total in column F instead of 10,754, would read 11,581.

[fol. 4020] Q. Would that produce any change in the casualty rates in columns G and H?

A. It would produce a slightly higher average rate. In column G the casualty rate on a car-mile basis would read 7.04 instead of 6.54, and column H on a train-mile basis would read 2.96 instead of 2.75.

Q. Now, going to line 14 of exhibit 266, have you the substituted figures there based upon the inclusion of these other two causes?

A. I have.

Q. Will you read those the same as you did for line 7?

A. In column D the figure would be 34 instead of 24; in column E, 4,906 instead of 4,540; and in column F, 4,940 instead of 4,564; and in column G, the rate on a car-mile basis would be 3.69 instead of 3.41; and on a train-mile basis in column H the figure would be 1.69 instead of 1.56.

Q. Now, going to line 19, have you the substituted figures there?

A. In column D, the figure would be 18 instead of 13; in column E, 2,268 instead of 2,061; in column F, 2,286 instead of 2,074; the casualty rate in column G on a car-

mile basis 2.64 instead of 2.39; and on a train-mile basis [fol. 4021] 1.21 instead of 1.10.

Q. And have you the overall total for the entire period and the overall rates, line 20?

A. The overall rate or grand total in column D, 118 instead of 90; in column E, 18,689 instead of 17,302; in column F, 18,807 instead of 17,392; and the casualty rate in column G on a car-mile basis, 4.89 instead of 4.52; and on a train-mile basis, column H, 2.15 instead of 1.99.

Q. Now, would the substitution of the figures which you have recited produce any changes in the comparisons of average casualty rates which appear in lines 21, 22 and 23?

A. Yes, some slight changes.

Q. Will you read those substituted figures?

A. On line 21 in column G, the percentage figure is 47.59 instead of 47.86 per cent. In column H it would read 42.91 per cent instead of 43.27 per cent; on line 22, in column G, 28.46 per cent instead of 29.91 per cent; column H, 28.4 per cent instead of 29.49 per cent; and line 23 in column G, 62.5 per cent instead of 63.46 per cent; column H, 59.12 instead of 60 per cent.

Q. Now, Mr. Sullivan, do you by the presentation of these statistics, including these other two code causes 6411 and 6736; concede or suggest that the showing on exhibit [fol. 4022] 266 is in any way incomplete?

A. No, I do not.

[fol. 4023] Q. Mr. Sullivan, on exhibits Nos. 274 and 275 and as well on exhibit No. 280 which is the comparison of casualties to road freight conductors, brakemen, and flagmen on duty sustained in train and train service accidents for Nevada and Arizona, covering only those accidents caused from sudden stopping, starting, lurch, or jerk of train, have you made a study of these accidents as they are shown in individual detail in exhibits Nos. 274 and 275 to indicate their frequency or infrequency as the case may be?

A. I have.

Q. Will you look at exhibit No. 274 and indicate whether from the face of that exhibit there are shown substantial intervals in months between successive occurrences at various periods?

A. I have, and as an example, by referring to sheet No. 10 it will be observed that there were none of that particu-

lar type of casualty during the twelve months between July 19, 1935, and July 6, 1936; none between the four months, February 6, 1937, and June 17, 1937; none during the six months, December 24, 1937, to June 17, 1938; and by reference to pages 11 and 12, none during the ten months, August 5, 1938, to June 2, 1939.

Mr. Booth: Is that Arizona or Nevada?

[fol. 4024] A. That is Arizona.

Mr. Mason:

Q. Are there similar comments upon exhibit No. 275, the Nevada showing?

A. Yes, for example, by reference to sheets Nos. 6 and 7, there were none of that type of casualty during the nine months between August 22, 1935, and May 26, 1936; none during the five months between January 10, 1937, and June 22, 1937; none during the four months between August 5, 1937, and December 15, 1937; none during the eleven months between December 15, 1937, and November 18, 1938; and none during the eight months, February 13, 1939, to October 11, 1939.

Q. I take it that your study relates only to the period since 1935?

A. Yes, you can follow through in a similar manner any of the other years.

Q. Are there comparable intervals in other years?

A. Shorter or longer.

Q. Mr. Sullivan, I think in the course of your comments on the inclusion of accidents in yards in some of your showings that you indicated some relationship between yard movement and number of trains handled. Is there any direct connection between the amount of switching or [fol. 4025] other yard activity and the number of trains handled?

A. Yes, there is.

Q. What is it?

A. There is a direct relationship in switching incidental to changing cabooses and that switching which is necessary on an individual train by reason of keeping it within certain restricted limits if there are any.

Q. Do you have any example which will illustrate your testimony, such as for example, at Yuma?

A. Of course I am speaking now from my experience during the time I was there. A single train would arrive

at Yuma with one caboose and be received at one track, consisting of any number of cars over 70 to a larger number; for example, a train of 140 cars of perishable arriving at Yuma from the west would be received at one track with one caboose. That train would be made up into two trains and would have to be placed on separate tracks, a caboose placed on each train, an engine placed on each train, and occupy the two tracks, leaving at different times, while the one train would arrive at one track. That switching at Yuma or any point where yard engines were employed is undertaken and handled by yard switching crews as distinguished from road crews.

[fol. 4026] Q. I think you were asked in the course of your cross-examination with reference to exhibit No. 291 to provide the form T report in connection with item No. 3 of that exhibit, the accident at Cobre in which a passenger lost his balance and fell in the car when the train stopped. I believe the suggestion of Mr. Strouss was that that should be classed as an accident due to sudden stop, start, lurch, or jerk of train?

A. He asked me if it should not. I don't know whether he meant to suggest whether that was true or not but he asked if I would secure the form T report for his examination.

Mr. Mason: May the record show the form T report has been furnished. Do you wish to make any further use of it, Mr. Strouss?

Mr. Strouss: I am perfectly willing that it be read in if you desire. It doesn't appear to be a slack action.

Mr. Mason: It is not even a sudden stop, start, lurch, or jerk of train because the form T report, you have the copy before you, indicates after investigation it was developed there was no rough handling of the train and nothing out of the ordinary and the passenger was injured because of her advanced age and inability to take care of [fol. 4027] herself.

Mr. Strouss: I think that is correct.

Mr. Mason: I think that is all we have, Mr. Sullivan.

Recross-examination.

By Mr. Strouss:

Q. Mr. Sullivan, when you were asked regarding retainers, it is a fact there are special rules on certain di-

visions with respect to the use of retainers which appear in the employees' timetables?

A. That is correct, on each of the operating divisions.

Q. You were just asked concerning switching. In the exhibits Nos. 274 and 275, the detail there would show any of those accidents that occurred in switching operations, would it not?

A. No, not by yard switching crews. If injuries were received in road freight train operation, they would appear.

Q. This does not include switching crews?

A. No, it does not.

Q. You haven't put in any exhibit showing any such information?

A. Not separately for terminals but it is included in those exhibits which describe or refer to casualties to em- [fol. 4028] ployees on duty in all classes of service. That includes yard men and yard enginemen.

Q. It is included in the aggregate but not in detail?

A. Not in detail, no.

Q. This morning you testified you were superintendent in Nevada?

A. Assistant superintendent.

Q. When was that?

A. In 1935 and 1936.

Q. What did you mean by the term "unusual" when you say that it was very unusual for a short train to be operated?

A. Compared with the normal through operation on the main lines, the trains of considerably more than 70 cars predominated and it was unusual considering the bulk of trains operated to operate one of less than 70 cars.

Q. Would you say it was one to four or one to six or what do you mean by the term "unusual"?

A. In a 24-hour period there might be 12 or 14 trains operated. During that period there would be none of less than 70 cars. On the following day there may be with that same number of total trains, there may be one or two. [fol. 4029] Eliminating the local freight on the west end, there would be a number of days between Sparks and Ogden when no trains of less than 70 cars would be operated.

Q. Would you say the percentage would be probably less than 20 per cent?

A. I wouldn't attempt to say exactly in percentage, but the predominant operation when I was there was long train operation to the extent there would be days or twenty-four hours as I explained that there wouldn't be any trains of less than 70 cars.

Q. Would there be days when there wouldn't be over 70 cars?

A. No.

Q. Would there be days which would bring the average up for a period of a month or a year when your short trains would run as high, say, for a period of a month, 25 per cent of the trains operated?

A. No, it would't be that high. During certain seasons of the year when there is a light movement of westbound manifest freight, on account of the fixed departure times from Ogden the number would approach the shorter lengths, not necessarily under 70, on account of the lack of volume of traffic to fill up the trains.

[fol. 4030] Q. You were asked by Mr. Mason about exhibit No. 186. I will ask you to look at exhibit No. 185 which was introduced in evidence by Mr. Sines. It appears in the State of Nevada there were 1633 trains of 70 cars and less, 3198 of 71 cars, and over, during the periods for the months of January, April, July and October, 1939, or the so-called long trains being in the ratio of 66.2 per cent or one short train for every three trains.

Mr. Mason: The question is unfair in that it does not call the witness' attention to the fact that this includes the operation west of Sparks concerning which he didn't testify in answer to my question.

Mr. Strouss: I don't like that insinuation. I asked the witness to look at the exhibit and see what the exhibit states. I don't think there is anything unfair in that.

The Court: No, the Court sees nothing unfair in it. The witness is able to take care of himself. He may answer.

Mr. Mason: My question had to do with the operation on the main line between Sparks, Carlin and the State line. I think the witness' answer should be specifically so confined.

The Court: Go ahead.

[fol. 4031] A. I wouldn't question in the least the accuracy of the information that is shown on exhibit No. 185. I was not employed on that division during that time and I had nothing to do with the study from which this was prepared.

Mr. Strouss:

Q. You don't think the percentage during the period that you were employed there would be comparable to what is shown by this exhibit?

A. I am sure it would not be comparable because I rode too many trains, I know what was on the railroad.

Q. It is possible from the train sheets covering that period to make an absolute count of the trains, short and long, isn't it?

A. That is true. I don't recall whether this includes the local freight trains or not, and as I testified, excluding the local freights, I was referring to the through freight operation between Sparks and Ogden. Practically all of the local freights are shorter than the general run of through freight trains.

Q. Your testimony as to the short train being unusual was directed to through trains and did not intend to include locals?

A. That is correct.

[fol. 4032] Mr. Strouss: I think that is all.

Redirect examination.

By Mr. Mason:

Q. Your testimony did not relate to operation west of Sparks, did it?

A. No, my statements were confined to the state of Nevada, associating them to the exhibits I have offered which confined the showing to the state of Nevada and the state of Arizona.

Q. I mean your testimony as to the frequency of long train operation did not deal with that part of the Nevada lines between Sparks and the state line?

A. No, because that was operated by the Sacramento division.

Q. In your testimony as to frequency of long and short freight trains, you were likewise not referring to the line between Fernley and the California line?

A. I was not.

Q. I call your attention to the fact that exhibit No. 185 shows between Sparks and Carlin 72.4 per cent trains in excess of 70 cars and between Carlin and the Nevada-Utah line 88.41 per cent in excess of 70 cars. Is that the [fol. 4033] particular district you had in mind in your testimony as to the relative frequency of long and short train operation?

A. Read the question, please.

(The question was read by the reporter.)

A. That is the territory, that is correct.

Mr. Mason: —

Q. When you speak of trains, do you count a train as twice or three or four times between Sparks and Ogden or is it a single unit all the way?

A. My conception of a train is the one defined by the Interstate Commerce Commission, the movement of a train between terminals in charge of one crew.

Mr. Mason: That is all.

(Witness excused.)

[fol. 4034] W. H. KIRKBRIDE was recalled to the stand.

Mr. Mason: What is the pending question?

Cross-examination (Continued):

Mr. Strouss: I had asked Mr. Kirkbride to take the profile maps of the lines through Nevada and point out to me the territory which is comparable to the territory in exhibits 301, 302 and 303.

Mr. Mason: First of all, you asked him, record page 3878, whether or not there was only one curve as sharp as six degrees in Nevada, and I think he has the data on that. Will you deal with that first and then go to the comparable territory?

Mr. Strouss: That is all right.

The Witness: As to the question about six-degree curves, I would wish to refer to profile sheets V-1, P-1, and V-1, P-1 A, and the third, V-1-P3.

The Court: These profiles that you have just referred to, Mr. Kirkbride, are they in Arizona or Nevada?

A. They are in Nevada. On V-1, P-1, I have marked [fol. 4035] in yellow pencil the location of a six-degree curve in the double track just west of mile-post 229; also in yellow pencil on the same sheet the location of a six-degree curve which exists in the eastward track just west of Fleish station near mile-post 229.8. Referring to profile V-1, P-1A, I have marked in yellow pencil the location of a six-degree curve which exists in the westward track just west of the third crossing of the Truckee River near Fleish. On profile sheet V-1, P3, I have marked the location of an eight-degree curve to the right reversing to a four-degree and 30 minutes compounding to a five-degree curve to the left, located in the double track at mile-post 237.1. I wish to further say, though, that in recent years this group of reverse curves has been changed, and it is my impression that the curvature was cut down in the order of six-degree and five-degree. I wish also to say that Weso, where connection is made to the Western Pacific and for the purpose of changing the course of all eastward S. P. trains to Western Pacific track, No. 14 turnout leads to two five-degree curves and at Carlin, the west détour, which is a connection between the Western Pacific and the Southern Pacific track, for the purpose of passing Western Pacific freight [fol. 4036] trains on the S. P. tracks, a five-degree and a six-degree curve exist, and east of Carlin where the connection is from the S. P. track to the W. P. tracks two six-degree curves exist.

Mr. Mason: I think the next question was the one at page 3880, referring to profiles showing territory comparable to the territory shown on exhibits 301, 302, and 303. Is that the next question you would like to have answered, Mr. Strouss?

Mr. Strouss: Yes.

A. It is my opinion that the profiles which I have just exhibited, representing the territory from the California state line——

Mr. Strouss: That is V-1, P-1?

A. Yes; those profiles extending; the first one is V-1, P-1, extending from the California-Nevada state line and on through——

Q. I wish you would just give me the profile.

Mr. Mason: Well, I think he should be permitted to describe the territory, then he can give you the profile afterward.

Mr. Strouss: He can describe the territory after he gives me the profiles. That is what I asked for in the question.

Mr. Mason: The question is, "Will you refer to the pro- [fol. 4037] file map of the main line across Nevada, and point out what territory in Nevada is comparable to the territory shown in exhibits Nos. 301, 302 and 303?" The witness started to do that, and was interrupted.

The Court: Go ahead, Mr. Kirkbride.

The Witness: (Continuing). Continuing on to V-1, P-2, V-1, P-2A, V-1, P-3, V-1, P-3A, V-1, P-4, V-1, P-5.

Mr. Strouss: What about this one?

A. That also is included, V-1, P-1A.

The Court: If it is going to take some little time to locate we will take our recess at this time.

(Thereupon, a short recess was taken, after which the witness was recalled to the stand, and proceedings were resumed as follows:)

[fol. 4038] W. H. Kirkbride resumed the witness stand.

Mr. Mason: We had gotten down the line part way I think from the California boundary line.

A. Also the profile sheets V-2, P-1; V-2, P-2; V-2, P-3; V-2, P-4; V-2, P-5; V-2, P-6; V-2, P-7; and V-2, P-8.

Mr. Strouss:

Q. That is all the territory which you consider comparable?

A. I consider that one section of territory comparable to the territory within which the three profile exhibits previously submitted rested, but I also wish to point out two other territories, namely, the stretch between Wells and Moor, and between Valley Pass and Montello. The

profile sheets between Wells and Moor are V-4, P-19; V-4, P-20; V-4, P-21; and the profile sheets, Valley Pass to Montello, are V-4, P-27; V-4, P-28; V-4, P-29; V-4, P-30; V-4, P-31; V-4, P-32; and V-4, P-33.

Mr. Mason: In order that the record may be clear, what is that territory that you first described before you went to Wells and Moor and Montello territory?

A. I described the territory in the Truckee Canyon extending from the state line between California and Nevada [fol. 4039] to Reno-Sparks and on to Fernley where the line has by that time departed substantially from a canyon territory.

Mr. Mason: That was the first set of profiles with the initials V-1 and V-2 that you handed to opposing counsel, is that correct?

A. Commencing with V-1, P-1.

Mr. Strouss: I ask that these profiles which the witness has just referred to be marked for identification.

The Court: They may be marked.

The Clerk: Plaintiff's exhibits Nos. 306, 307, and 308 for identification.

Mr. Strouss:

Q. These are records from your office, are they?

A. Yes, sir.

Mr. Strouss: We offer them in evidence.

The Court: Had you finished your description of the other territory in Nevada covered by these profiles, Mr. Kirkbride?

A. I had not.

The Court: All right, go ahead.

A. The second location between Wells and Moor is the development up the westerly slope of the Pequop Mountains and the third exhibit from Valley Pass to Montello is the [fol. 4040] development down the easterly slope of the Pequop Mountains to Montello from Valley Pass.

The Court. So there are three territories that you consider comparable to the territory covered by the three profiles introduced the other day?

A. Yes, sir.

The Court: Mr. Strouss offered certain exhibits in evidence. Is there any objection to them, Mr. Mason?

Mr. Mason: No objection. I take it they will be reproduced and copies furnished for the record?

Mr. Strouss: I will undertake to have them reproduced if it is stipulated I may withdraw them for that purpose.

The Court: The various profiles referred to by letter and number by Mr. Kirkbride which have now been offered in evidence may be received in evidence and photostatic copies substituted in lieu of the originals which will be returned to counsel.

Mr. Mason: What was that first number?

The Clerk: 306.

Mr. Mason: Exhibit No. 306, in order that the record may be clear, the set of profiles covering the line between the California and Nevada state line and approximately [fol. 4041] the station of Fernley—what is that milepost, Mr. Kirkbride?

A. At Fernley?

Mr. Mason: Yes.

A. 275, I think.

Mr. Mason: No. 307 appears to be the section west of Valley Pass although the witness referred only to the district between Valley Pass and Montello from approximately milepost 638 west of Valley Pass to milepost 664 east of Montello. Exhibit No. 308 covers the territory from milepost 606 west of Wells to milepost 618 approximately which is just east of Moor.

The Court: I believe our record is clear now that there are three separate and distinct sets of profiles covering three separate and distinct territories which you have offered in evidence and which have been admitted in evidence as plaintiff's exhibits Nos. 306, 307, and 308.

Mr. Strouss: Yes, your Honor. That is all.

(The documents referred to were received in evidence and marked "Plaintiff's Exhibits Nos. 306, 307, and 308.")

[fol. 4042] Redirect examination.

Mr. Mason:

Q. Mr. Kirkbride, referring to the district covered by exhibit 306, the district in Truckee Canyon, will you state

generally why you consider that comparable to the territory covered by Exhibits 301, 302 and 303?

A. It is territory that we call curve track territory, the location is to a very considerable extent located on the side of the hills that come down into the river; there are bridge crossings, the gradient of the ascending track westward from Sparks to the state line is on a ruling grade of 1.1 per cent, the descending grade eastward is on a 1½ per cent grade. When one examines this track structure on the ground, you see a succession of tangents and curves equipped with spirals and suitably and properly elevated. I consider that situation comparable to the territory between Tucson and Mescal, and Mescal and Dragoon, where an examination on the ground would again also reflect the fact of curve track, the tangents, curves properly spiralled and superelevated, some steel bridge crossings, the ascending grade eastward being a ruling grade of 1.06 and the gradient descending from Mescal to Benson being 1.4 per cent, and after the crossing of the San Pedro River, the [fol. 4043] ruling grade to the Dragoon summit being 1.4.

The Court: Where do you cross the San Pedro? Is that near Benson?

A. That is about a mile east of Benson.

Mr. Mason: Mr. Kirkbride, you have also referred to the line between Wells and Moor, and between Montello and Valley Pass as being comparable to the territory shown on these three exhibits.

A. In the same way that the locating engineers had to develop a railroad out of Tucson to Mescal Summit, down to Benson, and develop out of Benson, up the barrancas to Dragoon, the development of a railroad was made from Wells up to Moor, which is approximately the levelling-off place of the Pequop Mountains. In a similar manner, the development was made downward along the easterly slopes of the Pequops from near Valley Pass to near Montello, the curvature being used in order to obtain the distance in an economical manner, and the gradient eastward ascending being a ruling grade of 1.5.

Q. That is Wells to Moor?

A. Wells to Moor, which is likewise the descending grade westward, and the gradient on the easterly slope from Valley Pass to near Montello being a ruling grade of 1.4 [fol. 4044] westward and the same grade descending.

Q. You speak of the ruling grade in this territory. When you arrive at the ruling grade, do you take into account whatever resistance there may be due to the influence of curves?

A. We do. In other words, the actual percent of grade is reduced where curves exist in order to make them exactly comparable to the grade on the tangent track.

Q. I am going to ask you to refer to exhibit 301, and see if there are any examples of that and, by the way, what is the railroad engineer's term for the reduction of the slope at points where curves are encountered in order to obtain the same total resistance to the movement of traffic around the curve and up the grade as you would encounter on a piece of straight track?

A. We call that "compensation."

Q. Do you find an example of compensation of grade and curve, if that is the correct term, on exhibit No. 301?

A. I do. For instance, it will be noted on the upper part of the profile sheet west of mile-post 1037, that the gradient on tangent track is marked "1.40" and the gradient along that portion represented by two-degree curve is [fol. 4045] 1.360. In other words, the actual rise in a hundred feet has been reduced by some four one-hundredths due to the fact that a two-degree curve was involved. Now, refer to the curve No. 187, which is a ten-degree. The actual gradient or per cent of rise in a hundred feet is one per cent, whereas on the adjacent tangents the per cent is 1.4, thus there is a flattening of the slope amounting to four-tenths. Expressed mathematically, we allow four-hundredths of a foot per degree of curve. When we are dealing with ten degrees, four one hundredths by ten degrees gave .4 which is the equivalent rise if it was straight track.

Q. Does that mean then that you have compensated grade between the beginning and end of this ten-degree curve No. 187 of 1.4; is that the way you express it?

A. The compensated grade of this railroad location, as illustrated by this territory, is a compensated 1.4 per cent grade.

Q. Do I understand, Mr. Kirkbride, that where you have rise and curve together, you can express the total amount of resistance to the movement of traffic up the side of that hill by a percentage rise of grade which will take into account the curve?

[fol. 4046] A. We can, yes, sir.

Q. Is that shown on exhibit No. 301?

A. It is.

Q. And by the illustration that you have just referred to?

A. It is.

Q. Do you have the same compensation of grade for curvature on the Nevada districts which are referred to in exhibits 306, 307 and 308?

A. We do, with this explanation that in the early days of railroading, for instance, when the line was built in the Truckee Canyon in '65 or '66, up to '69, the art of railroading wasn't developed to the point of refinement that we now realize is necessary and put into effect, so that when the railroad was built in the 1860's and 69, compensation was not known, the spiralling of curves was not known, but we have overcome that deficiency by calculating the ruling grade, wherein we take cognizance of this necessity of flattening the grade around curves, so that in effect we have the same identical compensation in the Truckee Canyon, and we have compensated grades on the two lines referred to up Moor and from Valley Pass to Montello.

The Court: Mr. Kirkbride, do highway engineers in the [fol. 4047] construction of highways use this same principle in the building of roads?

A. May I explain, your Honor, that the problem of superelevation and spiralling of your curve and gradually bringing your superelevation up is all interlocked in this problem. Now, the highway engineers do carry out the principle of superelevating their curves, or banking their curves.

The Court: That is what I was going to say, you use the term "banking," don't you?

A. That refers to superelevation. I have only referred to the compensation of a grade. I am not sufficiently advised in connection with highways to say whether highway engineers have adopted compensation of grade. I know they are coming to it by reason of the fact that I have had occasion to travel over a grade from Dunsmuir eastward, which I was told was a seven per cent grade, and my attention was directed to the fact that when they came around the curves, which were rather short, they would purposely flatten the grade as well as banking the curve, so in that case they did carry out the exact principle that we carry out in railroading.

The Court: What do you mean by "spiralling the [fol. 4048] curve"?

A. I may again refer to the fact that it was not until the 80's that they recognized the need of not only flattening the grade around curves and at other places, but there was a need of making an easement between the tangent and the curve so that the lead wheels of a locomotive would not come to a sudden, abrupt change of direction. To illustrate, we will assume a locomotive moving on a tangent track approaching a curve. Now, by means of a spiral or an easement curve, we ease the pony trucks of that locomotive from nothing, from zero curvature into the maximum curve. Let us assume that it is a six-degree. Then this spiral or easement curve changes by ten-foot ordinants from a zero degree curve to a ten-minute, to a twenty-minute, and so on up to one degree, and two, the engine negotiates that track, the train behind the engine negotiates that track without the slightest hazard of derailment and without any shock to the passenger or freight equipment or to the trainmen or the passengers riding therein. However, you wouldn't accomplish that result if you didn't at the same time superelevate your grade and use what might be called a spiral to get to your maximum elevation. Again [fol. 4049] illustrating the problem, we limit the superelevation on the curves in the territory we have been talking about, a six, seven, eight, nine or ten-degree curve, we limit it to four inches of superelevation, I mean by that the outer rail is four inches higher than the inner rail, but at the C.C. point we begin to work down from the four degrees and finally at the beginning of the spiral, which is the point where we leave the tangent we are at level track, and that principle is on the basis of allowing a certain amount of superelevation per second of speed. In other words, you figure out an engine would move 44 feet in one second, and we would decide that we would want a half-inch superelevation in 44, and the first 44 feet would be half an inch; at 88 feet we would have an inch, and so on. In eight chords we would build up to the four inches of superelevation. The same principle, of course, exists in the compensation, only we are dealing with gradients.

[fol. 4050] Mr. Mason:

Q. Getting back to compensation, I am not sure that the record is quite clear, but do I understand, taking for

example this ten-degree curve just above Curvo or any other curve on the chart, exhibit No. 301, or these other exhibits, that the effect of the one per cent rise between the beginning and ending of that ten-degree curve plus the curve resistance itself to the movement of traffic is the equivalent of a straight 1.4 per cent rise on tangent track?

A. The answer to the question, if I understand it correctly, is this, that the locomotive will exert the same amount of energy on the 1.4 per cent grade if it is tangent track as on the ten-degree curve with one per cent grade.

Q. So that again, to express it, the entire effect of grade plus curve over any part of this track can be expressed by a figure representing grade line and in this case 1.4 per cent?

A. Yes, sir.

Q. And is the same true of the district between the state line, Fernley, Nevada, and between Wells and Moor and between Montello and Valley Pass?

A. It is.

Q. Is it generally true on the rest of the railroad that [fol. 4051] you have compensated the curves and the grades on the main line?

A. It is true on all of our railroad.

Q. Referring to exhibits Nos. 301 and 303 and omitting No. 302 for the moment, I will ask you whether those two exhibits which show the line between Curvo and Sibyl, and I think No. 303 is immediately east of Sibyl and continues on to mile-post 1046 approximately, will you say whether or not those represent the most difficult or the least difficult or the average conditions between Tucson and Dragoon?

A. They represent the most severe conditions with reference to curvature.

Q. With reference to grade?

A. Yes, they represent the maximum condition with reference to grade.

Q. Taking exhibit No. 302, that is the one that shows the line between milepost 1006 approximately and milepost 1011 in the neighborhood of Irene. Will you say whether or not that represents the most difficult or the least difficult or the average and typical condition?

A. I consider it represents the severest condition.

Q. Between Tucson and Mescal I intended to add to [fol. 4052] my question.

A. Yes, this sheet is in the territory between Tucson and Mescal. I consider that this sheet represents the severest condition of curvatures and the maximum condition of gradient.

Q. Between Tucson and Mescal?

A. Yes, sir.

Q. Are these sheets which show the line between mileposts 1036 and 1046, a distance of 10 miles, that is, exhibits Nos. 301 and 303, are those the most difficult or the least difficult of the average condition in Arizona?

A. The most difficult.

The Court: I notice, Mr. Kirkbride, if my calculations are correct, that the three exhibits offered by the plaintiff covered a territory of approximately 12 or 15 miles, whereas the territory that you have now described in Nevada, the three different tracks there would be approximately 85 miles all told?

A. Yes, sir.

Mr. Mason:

Q. Now going along the lines of his Honor's last question, have you figured out what the total mileage is over the main line from Yuma via Gila and Benson from boundary to boundary, across the state of Arizona?

[fol. 4053] A. I have.

Q. What is that mileage across the state of Arizona, boundary to boundary?

A. Eastward, 392 miles; likewise 392 miles westward.

Q. Approximately 15 miles or less are shown on these three exhibits out of that total of nearly 400, is that correct?

A. Yes, sir.

Q. How much of that total mileage, 392 miles, expressed in percentage is straight track?

A. 84 per cent both eastward and westward.

Q. How much of that total mileage expressed in percentage is curved track?

A. 16 per cent both eastward and westward.

Q. And out of that 16 per cent, how much consists of curves of more than six degrees in both directions?

A. 1.2 per cent eastward and .8 of one per cent westward.

Q. Have you also the figures of the total main line mileage via Sparks and Carlin between state line and state line across the state of Nevada?

A. I have.

Q. What are those figures?

A. 438 miles eastward and 444 miles westward.

[fol. 4054] Q. How much of the eastward mileage is straight track and how much is curved expressed in percentage?

A. 77 per cent eastward and 74 westward.

Q. How much is curved track?

A. 23 per cent eastward and 26 per cent westward.

Q. Is there any Nevada mileage along the line you have mentioned which consists of curves of over six degrees?

A. None.

Q. Just as a matter of comparison, Mr. Kirkbride, are you familiar with the line between Roseville, California, and Sparks, Nevada?

A. I am.

Q. That is the line over the Sierra Nevada summits, is it not?

A. It is.

Q. Have you the distance of that line?

A. It is 137.1 eastward and 138.7 westward.

Q. Is that double track throughout?

A. Yes, sir.

Q. How much of that mileage eastward and westward combined is straight track and how much is curved track expressed in percentage?

A. The total eastward and westward mileage amounts to [fol. 4055] 275.8, of which 42 per cent is straight and 58 per cent is curved.

Q. Are there any curves in that territory in excess of six degrees?

A. We have many curves up to ten degrees.

Q. What is the compensated grade eastward?

A. The ruling grade, which of course takes into account compensation eastward, is 2.47; the descending grade from Norden is 1.8.

Q. Is that territory between Roseville and Sparks more severe or less severe or quite similar to the territory between Tucson and Mescal and between Benson and Dragoon?

A. Much more severe conditions exist.

Q. I think you have also referred in your previous testimony to the lines of the company over the Tehachapi Pass. Are there any curves in that territory in excess of six degrees?

A. The curvature there amounts to as high as ten degrees and 30 minutes.

Q. What is the ruling grade, taking into account the curvature?

A. The ruling grade is 2.5 per cent on the mountains eastward.

Q. Does that take into account the effect of curves as well?

[fol. 4056] A. That compensates for curves.

The Court: What is the maximum degree of curvature that you can safely affect on your road?

A. We do not go beyond ten or ten-thirty unless conditions absolutely demand. For instance, on our main line to Portland where we are above Dunsmuir or where we loop out to climb out of the canyon of the Sacramento we use a fourteen-degree curve, the ruling grade in that territory being 2.2 compensated. As we enter Portland at the westerly or southerly end of the bridge over the Williamette River, it has been necessary to maintain a 18 degree curve there. We have in Cow Creek Canyon, which is the old line in Portland over the Siskiyous and extending on into Eugene, we have some eleven degrees and possibly a few twelve-degree curves and a few fourteen-degree curves where we develop up the slope of the mountain from Ashland.

Mr. Mason:

Q. That is the line from Eugene via Ashland to Black Butte, is it?

A. Yes, sir.

Q. Not now used as a through main line for freight if I understand correctly?

A. It is not used as the main line, but it is used by all classes of heavy power and they handle all the freight [fol. 4057] that originates in Medford and Ashland over the Siskiyous and down into Hornbrook. It is not a heavy traffic line. It formerly was before the building of the line from Black Butte by way of Crescent Lake.

Q. Are you familiar with the line between San Luis Obispo and Santa Margarita in California?

A. I am.

Q. Does that cross a mountain pass?

A. That crosses Santa Lucia mountain, from the Salinas Valley at Santa Margarita over to the coastal plain at San Luis Obispo.

Q. Do you have any curves sharper than six degrees?

A. We have ten-degree curves on that line.

Q. What is the ruling grade?

A. The ruling grade is 2.2 per cent compensated.

Q. In your cross-examination yesterday you were referred by Mr. Strouss to your statement that there are long stretches of tangent track and flat curves ranging from zero degrees and 30 minutes to six degrees. You are referring then to Nevada but you said you were comparing the state as a whole with the state of Arizona. Do you wish to refer to the profile showing the line between Maricopa and Wymola? I show you profile sheets which [fol. 4058] begin at milepost 879 in the neighborhood of the station of Buchan including sixteen sheets which continue on to approximately milepost 960 east of the station of Naviska. Are those a part of the three main lines in the state of Arizona?

A. They are.

Q. Of the Yuma-Gila-Tucson line?

A. That is correct.

Q. Will you state from examination of those profiles what they show as to the character of the gradients and curvature in that territory?

A. Commencing with the sheet at Buchan at milepost 880, the gradient eastward first is .5 per cent, changes to .36 per cent, flattens to .19 per cent, changes to .57 per cent, .41 per cent, .32 per cent. Is it counsel's desire that I outline all of those?

Q. No, just to indicate whether there is any part of it that exceeds .6 per cent.

A. Passing through Mobile the gradient is .45, no curves; on the next sheet extending from west of milepost 885 to east of milepost 889 the gradient ranges from .38 per cent to a level grade, the maximum gradient being .4 eastward to milepost 889.

Q. What about the curvatures?

A. No curves except for a thirty-minute curve just west [fol. 4059] of milepost 888, Enid.

The next sheet extending from west of milepost 890 to east of milepost 894 the gradient commences with .4 per cent descending; increases to .6 per cent and the gradient leaving the sheet is .32 per cent.

Q. Are there any curves?

A. There is a zero degree and ten minutes curve at Heaton which extends off of the sheet and onto the next sheet which includes the territory from west of milepost 895 to east of milepost 899. The zero degree and ten minute curve continues on to near milepost 897¼ about at Maricopa, that ten-minute curve being five miles in length. The gradients range from .32 to zero grade and the gradient leaving the sheet is .20 per cent. No other curves than the one just described.

The next sheet covering the territory from about 899¼ to 904½ shows gradients ranging from .2 per cent to .04, the gradient leaving the sheet is .17 per cent; no curves exist in this territory.

The next sheet including limits between 904½ to about 909½ reflects the gradients ranging from .18 to .42 per cent to .47 per cent to .5 per cent and the gradient leaving the sheet is .26 per cent; no curves exist on this sheet.

[fol. 4060] The next sheet extending from about 909¼ to 914½ reflects gradients ranging from .21 per cent to level grade with .19 per cent leaving the sheet; no curves exist on this sheet.

The next sheet extending from about milepost 914½ to 919¾ reflects gradients ranging from .19 to level grade, the maximum grade point being .49 per cent, the gradient leaving the sheet between .29 per cent; no curves exist on this sheet.

The next sheet extending from milepost 919½ to near milepost 925 reflects gradients ranging from .29 per cent to .07 per cent and the gradient leaving the sheet being in the order of .27 per cent to .16; no curves exist on this sheet.

The next sheet extending from near milepost 924¾ to milepost 930 shows gradients ranging from .16 to level to a maximum of .27 with a .23 leaving the sheet; no curves exist on this sheet.

The next sheet extending from milepost 930 to near milepost 935 reflects gradients from .23 to .18 to a maximum

of .3 with .25 per cent leaving the sheet; no curves exist on this sheet.

The next sheet extending from milepost 935 to 940 reflects gradients from .36 to .12 to a maximum of .49 leaving the sheet; no curves exist on this sheet.

[fol. 4061] The next sheet extending from about milepost 940 to 945 reflects gradients of .49 per cent to .52 per cent and .525 per cent as a maximum with .27 per cent leaving the sheet; no curves exist on this sheet except at the leaving end there is zero degree and ten minute curve to the right which extends for several thousand feet onto the next sheet, which sheet covers the territory from about milepost 945 to 950, the gradients ranging from .45, .14 to .27 to a maximum of .36; no curves other than the one above mentioned being shown on the sheet.

The next sheet extends from about milepost 950 to 955¼, the gradients ranging from .27 per cent to .16 per cent to a maximum of .4, the gradient leaving the sheet being .32 per cent; no curves exist on this sheet.

The next and last sheet extends from milepost 955¼ to about milepost 960½, the gradients ranging from .32 to level grade, the leaving grade being .23; no curves exist except that on the lower portion of the lefthand part of the sheet there exists a thirty-minute curve.

Q. Mr. Kirkbride, from your familiarity with the Southern Pacific lines in Arizona, particularly the line from Yuma via Gila, Tucson, and Bowie to the state line, would [fol. 4062] you say that the sixteen sheets including the line between Buchan and Naviska which you have just discussed or the three sheets which are in evidence as exhibits Nos. 301, 302, and 303 are more typical and representative of the lines as a whole?

Mr. Strouss: I object to that as calling for a conclusion, the profiles are here.

The Court: The objection is overruled, you may answer.

A. The railroad as reflected by the sheets we have just described is quite typical of the railroad as a whole or more typical of the railroad as a whole in Arizona than the three exhibits that you referred to.

Mr. Mason:

Q. Have you in mind any district in the state of Nevada which resembles more or less the district in Arizona be-

tween Buchan and Naviska which you have just been describing from the profile sheets? I show you the sheets between milepost 291 and milepost 316 and ask you to examine those and state whether or not they fairly resemble the territory you have just been describing in Arizona.

A. These profiles represent the railroad in Nevada eastward from Fernley, more specifically extending from mile-
[fol. 4063] post 291 to milepost 316, a distance of 25 miles.

The Court: That is between Fernley and Heaton?

A. It extends further than Heaton to a place called Parran. I consider this territory comparable to the territory which you have described.

Mr. Mason:

Q. And is it likewise characterized by comparatively long tangent stretches?

A. It is.

Q. And curves such as ten-minute and thirty-minute curves just as you have just described?

A. A very flat curvature of that order.

Mr. Mason: I won't ask the witness to go into detail from these sheets but they are available to counsel, of course, for cross-examination. I think that is all from Mr. Kirkbride.

[fol. 4064] Mr. Strouss: Mr. Kirkbride, I would like to have you check these sheets and I want the complete set of profile sheets for the state of Arizona.

The Witness: You want a complete set, you say?

Mr. Strouss: Yes, clear across the state. I want him to identify it as being a complete set, and this has the E.P. and S.W.

The Court: Is it your intention, Mr. Strouss, to offer in evidence a profile—

Mr. Strouss: Of the complete system.

The Court: We might save a little time by permitting this witness and his associates to get them together and hand it to you as a unit.

Mr. Strouss: That is perfectly agreeable with me. I didn't think it would take very long to do it.

Mr. Mason: Apparently it will take some time. They are not numbered. We can go ahead with the cross examination of another witness.

The Court: May I further ask you if it is your intention to then cross-examine this witness as to additional profiles?

Mr. Strouss: I have no further questions.

The Court: Then Mr. Kirkbride, you may step aside, and if you will get together the profile maps of your sys-
[fol. 4065] tem across the entire state of Arizona and hand them to counsel please, you may call your next witness.

L. D. Herrell was recalled to the stand.

Cross-examination.

By Mr. Strouss:

Q. Mr. Herrell, you participated in the redispatch of the trains for June and August of 1938?

A. I did.

Q. And that study and redispatch began on May 15, 1939, or thereabouts?

A. About that time, yes, sir.

Q. And lasted about four months?

A. Until about the first of September, I believe, maybe later; about four months.

Q. Just explain what was done.

A. Well, we took the same traffic that was handled, and the actual amount and redispatched it.

Q. When you say "we" what do you mean by "we"?

A. Well, I did my part from El Paso to Lordsburg, I took the same traffic that was handled in the actual opera-
[fol. 4066] tion and redispatched it, using larger trains.

Q. Who was working with you?

A. The chief dispatcher of the Tucson division.

Q. That was Mr. Baker?

A. Mr. Baker, and later Mr. Cassady, and they had other assistants. I did the work of the Rio Grande Division alone.

Q. Now, how did you balance your traffic from day to day, by car or by tonnage?

A. Oh, by car.

Q. Did you attempt to balance the tonnage?

A. No, sir.

Q. How did you determine the tonnage in the assumed trains?

A. Well, in the trains I operated westward from El Paso, the manifest trains were generally run with the same loads that they had on the actual operation, filling them with empty P.F.E.'s.

Q. Then, did you take the weight of the empty P.F.E. car?

A. I averaged 53 M's to the car.

Q. In redispatching, in order not to exceed the tonnage rating of your locomotive, it would be important to know the tonnage of your train?

A. Yes, we had that. We took the actual tonnage from [fol. 4067] the train sheet, and then if I added 30 empty P.F.E.'s to that manifest train, I would multiply 53 by 30 and add that to the tonnage of the actual train, which would give me the tonnage of the redispatched train.

Q. You took the tonnage of your actual trains, that is, the loads from the train sheet or from the report that came in on the train as it arrived?

A. That is correct.

Q. If that train was broken up in any way, the loads, how would you determine then; did you break any of your trains up or make them up so far as loads were concerned.

A. Not westward, I ran practically the same loads, adding empties only. The trains eastward, I took them as given to me by the chief dispatcher of the Tucson division at Lordsburg.

Q. You don't know how the tonnage of that train as it was originally made up in Yuma from a small train to a large train was determined?

A. No, I took that from what they gave me.

Q. Now, how did you identify the locomotives that you used?

A. As 4100's.

Q. You didn't have any particular number?

[fol. 4068] A. No, we used a certain class.

Q. The class of 4100's?

A. The class of 4100's, yes.

Q. No definite locomotive or any definite number like 4101?

A. No, sir.

Q. Well, you have quite a few sidings on your division in addition to those that are proposed to be extended and were used in this operation as lengthened sidings, haven't you?

A. Yes.

Q. In other words, you have quite a number of short sidings, shorter sidings than the ones, the 100-car sidings that were set up for this operation?

A. Yes, sir.

Q. You use those sidings in your regular operation of trains at the present time, and in the past?

A. We do.

Q. And the sidings being closer together, that gives you an opportunity to move your trains closer together for meets, don't they?

A. Yes, sir.

Q. If only fifty per cent of the sidings which are now in [fol. 4069] use were of length sufficient to accommodate a hundred-car train, it wouldn't be possible to handle long trains with the same flexibility, I mean having the same opportunity to move them up for meeting points unless you sawed the long trains through short switches.

Mr. Mason: It seems to me that that is rather a multiple question.

The Court: Well, if the witness doesn't understand it, he can state, otherwise I will overrule the objection.

Mr. Strouss: Do you understand what I am getting at, Mr. Herrell?

A. I don't believe I can quite grasp that.

Q. Under the proposed operation, only about fifty per cent of the switches are of a length sufficient to accommodate a hundred-car train, are they not?

A. You mean the sidings?

Q. Yes, I mean the sidings. Isn't that true?

A. I don't know how many sidings we have over there.

Mr. Mason: It is shown on the exhibits.

Mr. Strouss: I thought you were familiar with the map, with the proposed sidings set up.

A. I am; I know what sidings I asked to be extended. [fol. 4070] Mr. Strouss: I don't think I have that exhibit here.

Mr. Mason: That is exhibit 197.

The Witness: Well, I believe that map shows there are about sixteen or seventeen sidings that were not to be extended, and there are eight that were to be extended to hold 125 cars each. There are some that will hold considerably more than seventy cars now that it wouldn't be necessary to extend, such as Strouss and Deming, and Aden will now hold 80 cars, and there is an additional auxiliary track there that will hold about forty.

Mr. Strouss: Of course, to take advantage of that would mean cutting the train in two.

A. If necessary.

Q. And if a train were over—if the two trains meeting were both 100-car trains, it would mean that you would have to saw them around through an eighty-car switch?

A. No, we could leave 80 cars in the siding, and 20 or twenty-five cars on the auxiliary track.

Q. I mean in a station where you wouldn't have an auxiliary switch, but only an eighty-car siding.

A. Well, that would be rather bad train dispatching to get two 100-car trains to a siding which holds only eighty [fol. 4071] cars. We don't handle them that way.

Q. That is what I am getting to, Mr. Herrell, by having only this number of switches, of sidings, which will accommodate a hundred cars, it does reduce the points where you could have trains of that length meet, does it not?

A. That is correct.

Q. And, of course, as you testified a few minutes ago, having more sidings and nearer together, does give you an opportunity to make your meeting points closer where you can keep moving your trains up and save time; that is true?

A. That is true.

Mr. Strouss: That is all.

Redirect examination.

By Mr. Mason:

Q. Mr. Herrell, as I look at Exhibit 197 and remember your testimony, to make the extensions as contemplated by the exhibit, would give you ten points in the district between Lordsburg and El Paso, not including either Lordsburg or El Paso, where you could make meets with 125-car trains; am I correct?

A. That is correct.

[fol. 4072] Q. What is the distance between Lordsburg and El Paso?

A. 149 miles.

Q. Then that gives you a meeting point every fifteen miles on the average, would it?

A. Less than that; well, I don't think it would be quite that far between sidings, it wouldn't be over that.

Q. Let us consider one other point. You have west of El Paso, the double track extending to Anapra, what distance is that?

A. As I remember, it is approximately nine miles.

Q. Then the distance from Lordsburg to Anapra is a single-track district?

A. Yes, approximately 140 miles.

Q. You would have ten meeting points then in 140 miles, would you?

A. Yes, sir.

Mr. Mason: That is all.

Mr. Strouss: That is all.

Mr. Mason: May Mr. Herrell be excused permanently now?

Mr. Strouss: Yes.

(Witness excused.)

[fol. 4073] W. P. Herbert was recalled to the stand, and testified further as follows:

Cross-examination (continued).

By Mr. Strouss:

Q. Now, your exhibits 178, 179, and 180, Mr. Herbert, in those exhibits you make comparisons between the Tucson division, the Salt Lake division and the Pacific lines?

A. Yes, sir.

Q. Now, when you refer to the Pacific lines, do you include the Salt Lake division and the Tucson division?

A. Yes, I do.

Q. In other words, when you are making the comparison of the Pacific lines with the Tucson division, you are also including the Tucson division in the Pacific lines?

A. Yes, the Pacific lines is the total for all operating divisions in the Pacific lines.

The Court: And the Pacific lines are correctly shown here on exhibit No. 1?

A. That is right.

Mr. Strouss: That consists of quite a number of divisions, does it not?

[fol. 4074] A. Yes.

Mr. Mason: Two exhibits, 115 shows the divisions by mileage, and Mr. Kirkbride's exhibit, a map similar to number 1, I don't recall the number at the moment, shows the outlying boundaries of the divisions. It is No. 154. There are nine divisions altogether, as shown by 154.

Mr. Strouss: And the exhibit then isn't a comparison between the Tucson division and the other divisions of the Pacific lines other than the Salt Lake division?

A. No, it is a comparison between the Tucson division and the Salt Lake division as two separate divisions, and as a matter of information to show what the comparison is with the Pacific Line as a whole, including the Tucson and Salt Lake divisions.

Q. Taking your exhibit 180, for example, if you were to leave out the Pacific lines, take only the divisions other than the Tucson and Salt Lake divisions, the dotted line representing the Pacific lines would drop down lower than it appears upon the graph on the exhibit, isn't that a fact?

A. No, I don't know; it would have the combined influence of the Salt Lake division and the Tucson division.

[fol. 4075] Q. Is it possible from your exhibit 179 to take out from the Pacific lines which appear on sheet 3, the Tucson division which appears on sheet 2, and the Salt Lake division which appears on sheet 4, and get the comparison between the other divisions and the Tucson division?

A. From the face of the exhibit?

Q. I mean, would the figures show there? Deducting from the totals for the Pacific lines the Tucson and Salt Lake divisions, would leave the totals for the other divisions?

A. Yes, that would be the difference, would be all other divisions.

Q. That would give a comparison?

A. Yes, it would. You would have to make separate calculations at the foot of the sheets.

Mr. Strouss: Yes, that is true.

The Witness: You would have averages of averages if you didn't do that.

The Court: But in all of your exhibits, Mr. Herbert, wherein you are seeking to draw these comparisons, you are treating of nine divisions comprising the territory shown on Exhibit 1 as the whole, as one unit?

A. Yes.

[fol. 4076] Q. Then you are comparing the whole, which you term the Pacific lines, with the showing made in the Tucson division and in the Salt Lake division, which are part of the whole?

A. That is right.

Mr. Strouss: Now, your testimony as to the crossing count in cities, I am not sure that I correctly understood your testimony there. Does that include crossings within one mile of the yard limits on each side of the station in a town or city?

A. It included crossings within one mile of initial switches.

Q. Of what?

A. Of the initial switches at those particular towns or cities.

Q. Well, I was wondering what that might mean. So far as Phoenix is concerned, for example, there are quite a few crossings both east and west of the station in Phoenix, are there not?

A. Yes, but with Phoenix we chose the city limits.

Q. The city limits?

A. I believe that I might have to check up on that to make absolutely sure. I have included there eleven crossings in Phoenix.

[fol. 4077] Q. I think you only went to the city limits.

A. Will that answer your question?

Q. Yes, that answers my question. Of course, the built-up part of the city extends beyond the city limits, that is, the legal boundaries of the city, and there are street crossings even beyond the legal boundaries?

A. Well, whether they are considered streets or not, I don't know; outside of the city limits they are usually considered county highway crossings.

Q. But your count ended at the legal boundaries of the city?

A. Yes, we took in eleven crossings in Phoenix.

[fol. 4078] Q. What about Tucson?

A. I wish to correct that at Phoenix, I took in twenty-two crossings at Phoenix; at Tucson, seven.

Q. Other towns like Yuma and Douglas, are they on the city limit basis or what?

A. Wherever we could, we took it from the initial switches; at Phoenix it is rather hard to establish the initial switch and still get all the city crossings.

Q. On that basis you counted 82 crossings within cities, is that the way I understood it?

A. Yes.

Q. What did you mean by "cities" in that respect?

Mr. Mason: I think the witness named them.

Mr. Strauss:

Q. Did you name all of them?

A. I named all I considered, yes.

Q. If you named all of them, I will pass that. In your exhibit No. 200 you showed a total of 654 crossings in the state. That would leave 572 unaccounted for. It is a fact that the Southern Pacific for a big part of its mileage in this state runs through quite populated territory?

A. Yes, through the Salt River Valley and the Gila Valley on a branch line is also quite populated and has a num-[fol. 4079] ber of crossings.

Q. From below Buckeye to Picacho you are going through farming country that is populated on both sides of the road?

A. Yes, from about Buckeye to south of Chandler and from Chandler to Picacho it is not so densely populated. You have some at Coolidge, a small area there.

Q. There are communities on both sides of the track?

A. There are farms on both sides of the track.

Q. And crossings to connect those communities?

A. Yes.

Q. Near Mesa and Chandler and little towns like Kyrene and Gilbert which are not on your railroad but are connected to Mesa and Chandler by highways that cross your tracks?

A. Yes.

Q. They are connected to other communities, farming communities around there connected with Gilbert and Kyrene?

A. Yes, they will cross in one or two places from Kyrene over to Gilbert.

Q. You have instances where there are towns that are not immediately adjacent to your tracks, may be back a mile or two or three miles from the tracks but have cross-[fol. 4080] ings over your tracks to communities connected with those towns. Those crossings would not be counted in this count. I mean take a place like Litchfield which sets back four or five miles. There are crossings which would provide means for farmers to come into Litchfield?

A. Crossing our tracks?

Q. I think so.

A. If it crosses our tracks, it is included in this count.

Q. It wouldn't be in the town?

A. Perhaps not, there would only be one of the crossings from Litchfield across the track.

Q. Out around Tolleson there are a number of crossings through that section that cross the tracks?

A. Yes, right in that particular district of Tolleson they have a crossing on every section for a few miles there.

Mr. Strouss: I think that is all.

(Witness excused.)

The Court: Is there anything else you wanted from this witness, Mr. Mason?

Mr. Mason: I don't think so.

The Court: We will be at recess until 9:30 tomorrow morning then.

(Thereupon the court stood at recess until 9:30 A.M., February 19, 1941.)

[fol. 4081] February 19, 1941, 9:30 o'clock A. M.

Proceedings were resumed at this time as follows:

The Court: You may proceed.

Mr. Strouss: These are the profile maps for Arizona.

Mr. Mason: Yes. Now, I am advised that the documents that you have there, Mr. Strouss, are the profiles of the line from Yuma to Cavot via Gila and Bowie, and from Tucson to the state line west of Rodeo, New Mexico, via Douglas.

Mr. Strouss: May we have the profiles from Yuma to Cavot marked for identification?

The Court: Yes, they may be marked.

The Clerk: Plaintiff's exhibit No. 309 for identification.

Mr. Strouss: And the profiles of the line from Tucson to the New Mexico line through Douglas.

The Court: That may also be marked.

The Clerk: Plaintiff's Exhibit No. 310 for identification.

Mr. Strouss: Now, we offer in evidence plaintiff's exhibit 309 for identification.

Mr. Mason: No objection.

The Court: It may be admitted.

[fol. 4082] (The documents referred to were received in evidence and marked "Plaintiff's Exhibit No. 309.")

Mr. Strouss: And plaintiff's exhibit No. 310 for identification.

The Court: It may be admitted.

(The documents referred to were received in evidence and marked "Plaintiff's Exhibit No. 310.")

Mr. Mason: I suggest as a matter of mechanics that these are permanent records of our company and to impound those in court——

Mr. Strouss: I am not going to undertake to say we will pay for photographing all these exhibits. I don't think it is incumbent upon me to undertake to pay the expense of having all those photographed.

The Court: Of course, Mr. Mason, the Court will be disposed at the proper time, if it becomes necessary, to release the originals where substitutions can be made of certified copies. It may be possible, Mr. Strouss, by the time you get through with them that there will be only certain ones that you will be primarily interested in.

Mr. Strouss: That is true, but there was testimony yesterday as to what was typical territory in this state, which would make all of them necessary.

[fol. 4083] Mr. Mason: I don't suppose that plaintiff will be permitted to withdraw them from the custody of the court to work with them, will he?

Mr. Strouss: I understand from Mr. Sines you have a copy of these profiles in San Francisco.

Mr. Mason: Yes, we have copies of them, but what I suggest is this: We have furnished copies of all of the exhibits we have introduced even though it was some expense to photograph them or trace them, as the case might be; now the State comes and offers something and doesn't give us

anything with which to work and doesn't give itself anything with which to work. How can we write a brief based upon exhibits in the custody of the Court?

Mr. Strouss: I think you are in better position than I am. You do have other copies.

Mr. Mason: I certainly am not going to consent to your taking material out of the possession of the Court unless I am given a counterpart copy of them.

The Court: Well, we will cross the bridge on the matter of the release of any of them when we get to it.

Mr. Mason: I suggest, your Honor, that it is at least a [fol. 4084] course fraught with difficulty, and I think somewhat prejudicial to the proper trial of the case and particularly to the proper presentation of it by brief to have documentary exhibits introduced where copies of the exhibits are not furnished to the opposition.

Mr. Strouss: These are records of your company and I am informed that you do have copies of them. I don't think there is any point to this argument at the present time.

Mr. Mason: Our company covers from Portland to Tucumcari and over to Ogden. To say that they are records of our company is of very little use to us. Now, if those are going to become a part of the record, I suggest, in all deference, that we should be given copies of what the State introduces as documentary exhibits. If they were merely physical exhibits, there would be some point to the fact that they couldn't be duplicated.

The Court: I am going to overrule the objection at the present time.

Mr. Mason: I don't offer it as an objection, I offered it as a suggestion to Court and counsel.

Mr. Strouss: If I can I will have copies made but I won't say to the Court that I will promise to do that; I don't know that I can. May this be marked for identification?

[fol. 4085] The Court: It may be marked.

The Clerk: Plaintiff's exhibit No. 311, for identification.

Mr. Strouss: I offer this in evidence. I don't have copies of that at the present time but will procure them and see that you have them.

Mr. Mason: What has been handed to me here, your Honor, is a certified copy of certain investigation reports. I haven't had a chance to examine them, except the first

one relates to an accident occurring on the Pennsylvania Railroad. Now, if this is a part of the plaintiff's case, why, it properly comes into the case when the plaintiff has the job of going forward. If it is for the purpose of cross-examination, I don't know what witness is to be called in connection with the cross-examination on these. I don't know what place these have in the case right now.

The Court: State your purpose, Mr. Strouss.

Mr. Strouss: These are the certified copies of the reports of the Director of Safety covering five accidents that were included in the exhibit of Mr. Sullivan regarding the summary reports of the Interstate Commerce Commission, giving the details of the different accidents covered by the summary reports. Now, I have heretofore put [fol. 4086] in the one at Reno on the Southern Pacific.

Mr. Mason: That was during the cross-examination. Mr. Sullivan has been excused.

Mr. Strouss: No, I beg your pardon, Mr. Sullivan wasn't excused. There was the reservation that these certified copies that I was expecting from Washington, I reserved the right to introduce those certified copies through Mr. Sullivan. I think the Court will remember.

Mr. Mason: I don't know how Mr. Sullivan could testify to them, he didn't have anything to do with them.

The Court: Did I understand you to say, Mr. Strouss, that these particular accidents, the first one of which appears to be on the Pennsylvania Lines, the next one on the Missouri-Kansas & Texas Railroad, were specifically referred to in either the direct or cross-examination of the witness Sullivan?

Mr. Strouss: They are among the accidents which are shown on the exhibit.

The Court: Which exhibit do you have reference to, please? I have examined this proposed exhibit. Apparently none of these are on the defendant's lines. Do you care to examine them, Mr. Mason?

Mr. Mason: I have seen some of these before. I know [fol. 4087] about them.

Mr. Strouss: Exhibit 270 is the exhibit I referred to.

Mr. Mason: Well, do you wish to call Mr. Sullivan for further cross-examination. As I view these, these are part of the plaintiff's case in chief, or whatever the showing is to be called when the plaintiff takes the burden of going forward on March 25th.

The Court: Mr. Strouss, referring to exhibit 270, specifically, take the first accident you refer to and point out to the Court where there is any reference in this exhibit to that accident.

Mr. Mason: What is that first one, Mr. Strouss?

Mr. Strouss: 1768. It is shown in the index on page 23, sheet 23, as investigation number 1768.

Mr. Mason: Deans, New Jersey, June 7th, 1932. Well, of course, if it appears in the index it enters into the computation.

Mr. Strouss: It appears on page 17 under the heading of items of draft rigging. It is numbered 1768, the fourth one in the second group.

The Court: The objection is overruled.

(Thereupon, the document referred to was received in [fol. 4088] evidence and marked "Plaintiff's Exhibit No. 311.")

The Court: I don't see that there is anything Mr. Sullivan could add to it; he probably has no personal knowledge of those accidents.

Mr. Strouss: No, it would be only to ask him to identify the reports as the same reports covered by the exhibit.

Mr. Mason: I don't know that there was any objection made specifically to the introduction of this exhibit, but if there was I should like to have it understood there is no such objection upon the ground it is not the best evidence or hearsay or that it is irrelevant.

[fol. 4089] Henry W. Cassady was recalled as a witness and having been previously sworn testified further as follows:

Cross-examination.

By Mr. Strouss:

Q. Mr. Cassady, you are chief dispatcher on the Tucson division of the Southern Pacific Company?

A. Yes, sir.

Q. What part of the redispatch did you participate in?

A. The passenger trains for 1938, the Phoenix line freight trains for one month, December, 1938; the redispatch for

the month of April, two different kinds of trains, in 1940, that is, twenty-seven days in the month of April only.

Q. Where did that take take place? Where was it you did this redispatching?

A. San Francisco.

Q. Who was present and just what happened? Was it similar to what Mr. Herrell testified to yesterday? In other words, you were there in a group?

A. Yes.

Q. What was done?

A. In what particulars?

[fol. 4090] Q. Explain how you worked.

A. On what?

Q. On redispatching these trains.

A. Which ones?

Q. December of 1938.

A. I did not redispatch them, I simply put them on the work sheets, the white sheets, to move the total number of cars to show what we could have done by long train operation. We didn't enter station by station time, we didn't use a regular train sheet in this Phoenix work. The traffic over there is very light and we didn't consider it necessary to take a regular train sheet and work the trains up.

Q. How long were you working on this, making up this sheet or these work sheets?

Mr. Mason: Are you referring now to December, 1938, only?

Mr. Strauss: All work that you participated in.

A. I believe about five months.

Q. You didn't redispatch any trains on the Phoenix line?

A. No.

Q. Just put them on the work sheets?

A. That is all.

[fol. 4091] Q. In going through that I wonder whether you might not have reached somewhat the same result in the saving of trains by observing the law, I mean not exceeding the car limit, if you had the same time to sit down and try to rearrange your trains and keep them within the law?

A. I don't think so, no.

Q. I wonder if you would turn to December 5th. The sheets there show both the actual and the redispatch?

A. Yes, sir.

Q. Will you read into the record the trains as they appear in the actual and then in the redispatch, beginning with the fifth of December through and including the twelfth of December?

A. Westward from Tucson to Phoenix on December 5, 1938, first 903 identified as PFX-5—do you want it complete?

Q. Just the consist in addition to what you have given.

A. Seventeen loads, 49 empties leaving Tucson; arriving Phoenix with 15 loads and 51 empties.

Q. It is eastward that I want, Mr. Cassady.

A. Eastward freight train, Phoenix to Tucson, December 5, 1938, actual, extra left Phoenix with 10 loads and 26 empties, arriving Tucson with 10 loads and 23 empties. [fol. 4092] On redispatch this train was not operated.

Q. Give the following days.

Mr. Mason: I think the witness should explain that it shows on the sheet why the train was not operated on redispatch.

Mr. Strouss: I submit, if the Court please, I have a right to put my evidence in, in my own way.

The Court: That is right.

The Witness: A On December 6, A-139 was operated with 37 loads leaving Phoenix, 42 loads arriving Tucson. A local freight train, an extra, was operated with 8 loads and 32 empties leaving Phoenix, 26 loads and 26 empties arriving Tucson on the actual. On the redispatch A-139 left Phoenix with 47 loads, 12 loads of which were from the train of the previous day and from the drag of the same date, left Phoenix with 47 loads and 26 empties, arrived Tucson with 52 loads and 24 empties. A switcher was operated—do you want that—a switcher was operated to Chandler only—the switcher was operated from Phoenix to Chandler, a distance of 48 miles, did all necessary switching.

Mr. Strouss: That is the so-called turn-around?

[fol. 4093] A. That is all. Eastward on December 7th, Phoenix to Tucson, we operated A-140 out of Phoenix with 47 loads and no empties, into Tucson with 48 loads and no empties; on the redispatch this train was operated with 55 loads and 6 empties leaving Phoenix, arriving Tucson with 76 loads and 6 empties. The additional cars as shown on the

redispatch were from the extra east that was operated leaving Phoenix with same loads and 32 empties and arriving Tucson with 26 loads and 26 empties of the previous date. I might add, for information, that this drag was mentioned on the previous day, left Phoenix at 9 P. M. and arrived Tucson at 5:40 A. M. 904, A block, on the actual left Phoenix at 2:10 A. M., arriving Tucson 6:35 A. M.

On December 8th, A-141 out of Phoenix with 47 loads and 15 empties, arriving Tucson with 50 loads and 11 empties; a dead freight, an extra out of Phoenix, with 17 loads and 40 empties into Tucson with 23 loads and 31 empties, actual. On redispatch A-141 left Phoenix with 47 loads and 40 empties, arriving Tucson with 50 loads and 33 empties. The extra cars on A-141 out of Phoenix were empties into Tucson which were those handled by this extra east and we also operated another switcher to Chandler and return on that date.

[fol. 4094] On December 9th, A-143 out of Phoenix, 59 loads and no empties, arriving Tucson with 67 loads and no empties. Local or dead freight out of Phoenix with 7 loads and 53 empties into Tucson with 8 loads and 48 empties. On the redispatch A-143 had 71 loads out of Phoenix, 85 loads into Tucson. The local switcher or dead freight left Phoenix with 12 loads and 74 empties, arriving Tucson with 10 loads and 51 empties. The extra cars on A-143 also on this local extra were from the extra that left Phoenix at 9 P. M. on the eighth, arriving Tucson 5:05 A. M. No. 904 train arrived Tucson at six o'clock.

On December 10th, eastward from Phoenix to Tucson, A-144 out of Phoenix with 53 loads and no empties, into Tucson with 63 loads and no empties. The dead freight or the drag local out of Phoenix with 11 loads and 28 empties, into Tucson with 15 loads and 20 empties. On the redispatch A-144 left Phoenix with 53 loads and 20 empties, arriving Tucson with 63 loads and 20 empties. The dead freight was run as far as Coolidge only, because that was the destination of the other cars not handled in A-144.

Q. What was the consist to Coolidge?

A. The consist of this switcher here was 3 loads and 10 [fol. 4095] empties, 3 oil for Coolidge and 10 empty system boxcars.

On December 11th, eastward from Phoenix to Tucson, A-145 out of Phoenix with 61 loads, into Tucson with 67. On the redispatch A-145 out of Phoenix with 69 loads and

7 empties, into Tucson with 75 loads and 7 empties, the extra cars being the drag that was eliminated on December 10th. By the way, the drag on December 10th arrived Tucson at 6:40 A. M. on December 11th, the A block at 7:05 on December 11th.

On December 12th, eastward from Phoenix to Tucson, A-147 out of Phoenix with 57 loads and 9 empties, arriving Tucson with 57 loads and 6 empties. A-148 out of Phoenix with 24 loads and 28 empties, into Tucson with 28 loads and 26 empties. On the redispatch A-147 had 57 loads and 20 empties out of Phoenix, into Tucson with 57 loads and 17 empties. A-148 had 24 loads and 28 empties out of Phoenix, 28 loads and 26 empties into Tucson, the same as on the actual.

Mr. Strouss: No further questions.

[fol. 4096] Redirect examination.

By Mr. Mason:

Q. Mr. Cassady, from the testimony that you have just given on your cross-examination, it appears that the trains eliminated in the eastward movement during the week that you discussed were, generally speaking, a drag leaving Phoenix at 9 P. M. or later each day?

A. Yes, sir.

Q. And what you did according to your testimony as I understand it was to redispatch the cars handled on that drag so that they left Phoenix on the redispatch on the regular train in the very early morning?

A. That is right, except the short cars, there were switchers operated to handle the short cars.

Q. You operated switchers on the redispatch?

A. Just the same.

Q. And the times of the arrival of the redispatched cars at Tucson or cars handled on the redispatched trains to Tucson were from one to two hours later than if they had been handled on the preceding day?

A. That is correct as to loads only.

Q. In your redispatch handling in December, 1938, you said you didn't actually redispatch trains. I take it you [fol. 4097] reconsisted the trains?

A. That is right.

Q. As between Phoenix and Tucson and with reference to the intermediate points?

A. That is right.

Q. But you did not make up redispatched train sheets showing times at intermediate points?

A. No, sir, we did not.

Q. When you say you did not redispatch, you mean from the time standpoint?

A. From the time standpoint; only from the consist.

Q. Did you balance out your car handling during December, 1938, so that the same number of cars were handled east in your redispatch handling as were handled in the actual?

A. Yes, except I believe we had a few empties that moved Gila line rather than Phoenix line eastward. We matched car for car in the westward movement.

Q. Did you match car for car on the load movement?

A. Yes, matched car for car. The westward movement, if you will pardon me, is of vital importance in order to get the empty reefers to the loading points over there and [fol. 4098] we had to move a certain number of empty P. F. E.'s into this loading territory daily.

The Court: Do I understand that these operations about which you have just been cross-examined all have to do with operations between Phoenix and Tucson?

A. Phoenix and Tucson only.

Mr. Mason:

Q. Mr. Cassady, did you operate westward from Tucson to Phoenix during this week between the fifth and twelfth and generally during the month of December, 1938, in the same manner as you have indicated throughout your testimony as to the eastward operation?

A. Yes.

Q. Did you redispatch the westward cars and eliminate trains in the same way?

A. I think we eliminated some trains, I can't remember. We redispatched the cars, as I mentioned before, the empties were balanced and of course the load was balanced daily.

Q. In the operation of your redispatched trains eastward and westward, did you undertake to balance your power and your crews between Tucson and Phoenix?

A. Absolutely, yes, sir.

Q. So the result was to operate the same number of [fol. 4099] trains westward on the redispatch as had been operated eastward on the redispatch?

A. Eastward as had been operated westward because that is the away-from-home terminal.

Q. Do you recall whether you had to deadhead any power or crews during the month of December, 1938?

A. It seems as though there were some deadheads and maybe some light power, I can't recall it. I haven't looked that over.

Q. All of that would show up on the white work sheets?

A. That would show up on the sheets, yes, sir.

Mr. Mason: That is all.

The Court: May this witness be excused now?

Mr. Strouss: Yes.

The Court: You may be excused.

[fol. 4100] B. S. Sixes was recalled to the stand and testified further as follows:

Cross-examination.

By Mr. Strouss:

Q. I think your early exhibits pretty well speak for themselves. I will start with exhibit 189, if you will turn to that.

A. All right, I have it.

Q. In examining that exhibit, it appeared that at El Paso in 1939 6659 more cars were forwarded westward than were received eastward. Had you calculated that?

A. 6,659?

Q. Yes.

A. Yes.

Q. While at Ogden it appeared that 7,721 more were received eastward than were forwarded west?

A. Yes.

Q. Now, is that because the empty cars going east over the Ogden route are returned west over the Southern route to some extent?

A. You say empties going east?

Q. Maybe loads going east, but empties returning west are returned over the Southern route rather than back [fol. 4101] over the Ogden route. I might add along that

same line your next exhibit, 190, shows the total car-miles in each state and it appears that in Nevada the percentage of empties is, if my calculation is correct, 36.54 per cent of the total car-miles, while in Arizona the empties are 41.1 per cent of the total car-miles. In other words, there is a little less than five per cent more in Arizona car-miles, empties, than in Nevada. I am wondering, from the two exhibits, if it might be that a certain percentage of your empties are returned this way rather than by Ogden.

A. I wouldn't want to make a guess at that. That would be quite a study, to determine what it is, because there are so many different kinds of equipment involved.

Q. Have you calculated the percentage of empties to total car-miles on Exhibit 190?

A. You say had I?

Q. Yes, had you?

A. No, I had not.

Q. My calculation was 36.54 per cent empties in Nevada, and 41.1 per cent for Arizona.

Mr. Mason: Is that for any particular year?

Mr. Strouss: I was using 1939 as the year, yes, I didn't calculate the other years. Now, I think your exhibit 191 [fol. 4102] speaks for itself.

Q. Turning to exhibit No. 193, in preparing this exhibit and using the Pacific lines, you included the Tucson and Salt Lake divisions as a part of the Pacific lines?

A. Yes.

Q. There might be some difference in the graph if you were to limit the Pacific lines to the divisions other than the Tucson and Salt Lake?

A. Yes, that would change the graph.

Q. Now, of course, both gross ton-miles per train hour, and net tons per train would include all trains operated, that is loads and empties, or trains with mixed loads and empties, would it not?

A. Yes.

Q. So that the number of empties which are handled in one division would have its effect upon both the showing as to the gross ton-miles per train hour and net tons per train?

A. Any difference that might occur would be more marked in the net tons per train than it would be in the gross tons per train hour.

Q. But there would be a difference in both graphs, it would be greater in the net tons per train than any other, [fol. 4103] but there would still be a difference in the gross ton-miles per train hour also, would there not?

A. I don't know whether I can agree with you or not about the gross ton-miles per train hour. That is a function of locomotive loading and speed. The first thing that an operating organization, chiefly the chief dispatcher, figures on is to load his locomotive to the tonnage that it is capable of handling, and they take into consideration the schedule that the train has to make also. A trailing load behind the locomotive could consist of loaded cars as well as empty cars as far as building a train load is concerned. Then, too, if a train did have to be lighter, it would go faster probably, so it might build up the same gross tons per train hour.

Q. I am glad you said that because I understand from prior witnesses that if long and heavier trains were operated, they would operate as fast or faster than the short trains.

A. I don't think you have stated the entire problem.

Q. Referring to the lower chart, net tons per train, if any statement as to the preceding statement is correct, that the ratio of empties in Nevada is 36.4 per cent while in Arizona [fol. 4104] it is 41.1, or a little less than five per cent greater, if the ratio of empties in Arizona were brought down to that of Nevada it would increase the average tons per train as shown at the bottom of the lower graph, would it not? In other words, if you had a greater ratio of loads than you now have, it would increase your average net tons per train?

A. Yes.

Q. Now, would the car loading have some effect, also, upon both the lower and the upper graphs?

A. By car loading you mean the net tons per car?

Q. Yes, per loaded car.

A. It would have very little effect upon the upper graph.

Q. It might have some?

A. Well, I won't agree with you there, but it will have an effect on the lower graph.

Q. Will you turn to your 521's for 1939? What division do you have there?

A. This is the Rio Grande.

Q. Turn to the Salt Lake division or the Tucson, whichever one you find first.

A. Tucson.

Q. And at the bottom of the page is the item of net tons [fol. 4105] per loaded car. I want it for the year of 1939.

A. All right, Tucson for the year 1939.

Q. That shows, does it not, main line operations, net tons per loaded car east 20.0 tons?

A. Yes.

Q. West 20.5 tons?

A. Yes.

Q. Total 20.1 tons?

A. Yes.

Q. Now, will you turn to the Salt Lake division?

A. All right.

Q. East, 21.2?

A. Right.

Q. West, 23.1?

A. Yes.

Q. Total, 21.8?

A. Correct.

Q. That will show a loading the, or total loading, comparing the total loadings, of 1.7 tons per car greater in Nevada, or on the Salt Lake division than on the Tucson division, will it not?

A. Yes.

Q. And if that were added, taking a train of, say 60 cars, 60 loaded cars, that would be 104 additional tons [fol. 4106] added to a train of 60 cars?

A. Yes.

Q. Your column, then, for Tucson with that added car loading would be raised, would it not?

A. Yes.

Mr. Mason: How much would it be raised, Mr. Sines?

A. 104 tons.

Q. Or to 816?

A. Yes.

Mr. Strouss: Of course, as you said before, if this was for the lower graph there would be the additional raising of the column for whatever additional effect empties had on it?

A. You cannot double shoot on this, can you?

Mr. Mason: Not if you are going to put 60 loads in 70-car trains.

Mr. Strouss: I don't think I am double shooting this, Mr. Sines. I am asking you about tons per loaded car, not about average tons per train. Your data which is set out in 521 is tons per loaded car.

A. That is right. This is not tons per car, but tons per loaded car.

Mr. Strouss: That wouldn't be double-shooting would it? [fol. 4107] Mr. Mason: Please read Mr. Strouss' question just prior to the witness's remark about double shooting.

(Thereupon the following question was read by the reporter: "Of course, as you said before, if this was for the lower graph there would be the additional raising of the column for whatever additional effect empties had on it?")

Mr. Mason: Now, I suggest, Mr. Strouss, that either you are double-shooting or you are not; you can take your choice.

Mr. Strouss: The witness is capable of answering the question.

Mr. Mason: I don't think he should be confused by asking him a question and withdrawing it right away and saying, "That is not what I mean."

The Court: Go ahead, I think the witness can take care of himself. If he doesn't understand the question he can so state.

The Witness: Can you say it another way?

Mr. Strouss: Of course, the added car loading of 1.7 tons per loaded car would raise the column which represents the Tucson division, would it not?

A. That is right.

Q. Now, lowering the ratio of empties to the same ratio [fol. 4108] that it is in Nevada, would that still further raise the Tucson division column?

A. I don't think—it would if it were possible, but I don't think you have taken into consideration everything that has to be taken into consideration. If we were able to raise our loading, of course, in this Southern territory, we wouldn't need as many empties returning in the opposite direction; that would change exhibit 190 the percentages that were figured on 190 wouldn't apply.

Q. Of course, from your exhibit 189, it would appear that you are returning more cars westward than you are receiving in El Paso eastward?

A. That is right.

Q. You are returning more empties than you are loading and returning eastward, we might say.

A. That is still right, we are doing that.

Q. Now, isn't there another factor that should be taken into consideration so far as these graphs are concerned, and the column represented Tucson division, and that is the Phoenix line. As Mr. Cassady testified a little while ago, if you heard him, that that is a line of light traffic. Wouldn't that have its effect upon the tonnage for the division as a whole?

[fol. 4109] A. The Phoenix line is a light traffic line thinking of the total tonnage moving over the line. I don't recall that Mr. Cassady said that the trains operating on that line are light tonnage trains.

Q. Let me ask you this question: It is true that at least during the melon season and the lettuce season there are turn-arounds or gathering trains operated on that line?

A. That is right.

Q. And they are quite small trains? Are they not?

A. I would want to check that. I expect by the time they get back to Phoenix they are pretty well loaded, but in the gathering aspect, the gathering trains will be lighter than the through trains, yes.

Q. Of course, there is nothing like that in Nevada, you don't have the same type of trains in Nevada?

A. No.

Q. Now, in exhibit 194, I have asked you to get the information concerning the employees?

A. That is right.

Mr. Strouss: And that is to be put in, if the Court please, [fol. 4110] Mr. Sines has said that he will get it some time during the recess, and we will put it in at the time we reconvene.

Mr. Mason: What information is it?

Mr. Strouss: On the matter that appears in lines 20 to 37, inclusive, for the years 1930, 1931, 1932, 1933, 1935, 1936 and 1937.

The Court: As to which exhibit, Mr. Strouss?

Mr. Strouss: 194.

The Witness: That is right. That is my understanding, and that data is in the course of preparation in our time-keeping department in San Francisco.

The Court: We will take our morning recess at this time.

(Thereupon a short recess was taken, after which the witness B. S. Sines was recalled to the stand and proceedings were resumed as follows:)

[fol. 4111] Mr. Strouss: Mr. Sines, if you will turn to exhibit No. 198. As I understood your direct testimony, this is typical of the white sheets which were made?

A. That is right.

Q. First I will ask you to get the tonnage on the trains both actual and the redispatch. Do you have that?

A. Yes, sir.

Q. Will you give that for the actual first?

A. Y-310, 6,356 M's; Y-311, 5,850 M's; PY-412, 5,480 M's; C-413, 6,150 M's; C-414, 6,559 M's; CY-414, 5,200 M's; C-415, 6,630 M's; Y-312, 6,058 M's; Y-313, 6,114 M's.

Redispatch, Y-310-311, 10,530 M's; CY-412, 5,950 M's; C-413, 8,800 M's; CY-414-C-414, 8,650 M's; C-415, 8,450 M's; Y-312, 6,175 M's; Y-313, 9,300 M's.

Q. As I understood from the redispatch, there was no effort made to balance the tonnage in this redispatch, that is, it was the balancing of cars rather than the balancing of tonnage?

A. That is right.

Q. How was the tonnage in these assumed trains determined?

A. By using an average of 50, 51, or 52 M's for an empty [fol. 4112] car and an average of 90, 95, 96, 97, or 100 M's per loaded car, depending upon the average weight of the cars in the trains actually operated.

Q. Of course this redispatch is based upon operations of 1938?

A. That is right.

Q. Do you have the 1938, 521's? Will you turn to the Tucson division. The net tons per loaded car——

A. East, 19.8; west, 19.8; total, 19.8.

Q. Will you take the form 521 for 1940 and give the same?

A. East, 21.4; west, 21.0; total, 21.3.

Q. Your redispatch would not work with the 1940 carloadings, would it?

A. We made a 1940 redispatch.

Q. I mean this redispatch here, for example, CY-412—by the way, your tonnage rating for these engines was sixty-two hundred twenty M's, was it not, over this territory?

A. Yes.

Q. CY-412 had 5,950 M's?

A. Yes.

Q. The difference in loading there as I calculate it is a ton and a half per car?

[fol. 4113] A. Yes.

Q. Sixty-two loads would increase your M's over your engine rating, wouldn't it, so that you would either have to use a helper or——

A. Sixty-two times one and a half is 93 tons or 186 M's added on to the 5,950 is 6,136 M's.

Q. Take Y-312, that is 6,175 M's on your redispatch?

A. And 65 cars, yes. That would run that over the rating. There would be fewer cars handled on the redispatch and there would also probably be an offset on the actual however in the tonnage of the actual trains.

Q. On the actual, variables are shown under wages but you don't show that on the redispatch but from your testimony on direct examination that was taken in by a lump sum calculation, isn't that correct?

A. That is right.

Q. Why did you do that that way on the redispatch rather than carry it as it was in the actual?

A. The items that are carried in the variable column are unpredictable to a certain extent. It depends upon what the train and engine crews do themselves at initial and final terminals and it was also easier to handle in a lump [fol. 4114] sum, assuming that these variable allowances would increase or decrease with the number of trains run, that is, the number of crews having an opportunity to accumulate those variable payments.

Q. In exhibit No. 199 I wish to take these section by section. The first section, will you just explain what that covers? That has to do with unnecessary delays?

A. At El Paso, Rodeo, and Lordsburg, points east of and outside of the state or Arizona.

Q. This first section, what typical operation would that be, taking a car out of one train because of the Train Limit Law and putting it into another?

A. That is right, that was a typical operation in all instances except the first, and even there it is taking a car out of one train and putting it into a second train which would not have had to be run if it were not for the law.

Q. The delays which are shown here are the delays which occur at the terminal whether or not that time may or may not have been made up?

A. Yes, those are the times that occurred at Lordsburg and were the notations appearing on the dispatcher's train sheets or perhaps the conductor's delay reports in some [fol. 4115] instances, making an explanation of the extra amount of time spent there.

Q. Section 2, what is a typical operation which is covered by that section? I wondered whether I was correct in my analysis that this differs from the first one in that a car is taken out and left, say, at Yuma and then picked up by a later train?

A. That happens when train No. 1 is involved but does not happen when No. 43 and No. 5 are involved for any great length of time although there is a delay as you will note occasionally in column F when just trains Nos. 5 and 43 are involved, but the difference between Section 1 and Section 2 is that Section 1 is an extraterritorial delay or interference and Section 2 is a delay that occurs right here within the state of Arizona at Tucson and Phoenix.

Q. Section 3 would be similar except it is at Yuma and train No. 6 is involved?

A. That is right.

Q. Going back to sheet 5, involving Section 2, I wondered if there is some explanation of why the long delay on April 9th, an hour and fifty minutes?

A. Undoubtedly there is an explanation, but I don't remember. I can determine what it would be, however, [fol. 4116] if you want it.

Q. The exhibit would indicate it was all due to the necessity of switching cars because of the law and I wondered if that were actually true?

A. I will give you a pretty good guess. We had to handle those two cars shown in column H by operating a second No. 5 out of Phoenix. The situation developed so

quickly that we didn't have a crew and an engine ready to handle second No. 5, so second No. 5 couldn't get under way until the preparatory time had been used up and we got the crew down to the station and got the engine fired up. In the first instance, of course, it was because we couldn't handle as many cars in the first No. 5 as we wanted to.

Q. You might, during the noon hour, if it is convenient check and if that explanation is not correct——

A. I will be glad to do that.

[fol. 4417] Q. Now, 3A is similar to section 2, except that it has to do with Train No. 6 at Yuma, is that correct?

A. That is right.

Q. What about section 3B?

A. Well, the difference between 3A and 3B is that 3A is confined to Yuma, as is indicated in column D, whereas 3B, the occurrences happened at Tucson and El Paso, and it has the added feature there of having to put those cars back in the train that they came from, from train No. 6, because those cars are probably destined to some point on the Texas and New Orleans Railroad.

Q. Now, 4A, that is similar except that it applies to train No. 4?

A. That is right.

Q. And 4B would be similar to 3B, except that it applies to train No. 4?

A. Yes.

Q. And 5A and 5B are similar to 3A and 3B except that they apply to train 44?

A. That is right.

Q. And 6A and 6B, the only difference is that they apply to other trains?

A. That is right.

Q. Now, Section 7A and 7B—maybe I shouldn't take [fol. 4418] them together. 7A, that is interference at Los Angeles?

A. Yes.

Q. Just what is the nature of that interference?

A. I can answer that by referring to section 10. That is on sheet 20, item 98. On July 22nd, the diner T and N.O. 926 was cancelled between Phoenix and Los Angeles on Train No. 5. In order to make pick-ups and stay within the fourteen car limit, it was necessary to leave No. 5's

diner at Phoenix instead of carrying it on to Los Angeles. However, we have to serve breakfast on No. 5 next morning before that train gets to Los Angeles, so we have to deadhead a diner out of Los Angeles to meet train No. 5, and train 820, shown on sheet 12, takes that diner out of Los Angeles.

Q. And that is the operation which is shown under 7A?

A. Yes; and they meet train No. 5 up at Colton or some place up the hill and have to stop No. 5 and put that diner in after it has been set out by 820, of course, then they go into Los Angeles with the diner.

Q. Now, what is the type of operation which is shown under section 7B?

A. We are speaking here of westward trains, and this [fol. 4119] represents the work that was done on those trains at Yuma, putting them back together again in order to save expense when it was possible and desirable west of Yuma.

Q. Now, section 8 is delay to deadhead equipment, Yuma to El Paso?

A. That is right.

Q. And section 9, changing the routing of cars?

A. That is right.

Q. In going over these, I notice that the same item number will appear in different sections.

A. That is right.

Q. That is because that particular item comes under different types of operation that are set up here in the exhibit?

A. That is right, and because breaking an established routine has innumerable ramifications. Like dropping a stone in a puddle of water, it spreads out in all directions, and you have to do things to trains elsewhere, in some cases between Yuma and Los Angeles and intermediate stations, just because you cannot run 14 cars across the state. When we were making this exhibit we first set it up just to tell the story surrounding each event, but we found that we who [fol. 4120] worked on it couldn't comprehend its entire scope, so we classified it according to these subdivisions in this exhibit.

Q. I think section 10 is rather clear, cancelling the movement of cars?

A. Yes.

Q. Section 11 appears to be an error in figures there, item 68, shouldn't that be 96 locomotive miles incurred in column E? I notice items 72 and 84 are both 96 for that same Indio to Beaumont movement.

A. Well, there is an item 77 that only has 50.

Q. I wondered whether there was

A. I don't think so. If we found work for helpers on the other legs of the trips, we didn't charge those locomotive miles against the Arizona Train Limit Law, and that is what is involved here, as I understand it.

Q. I understood with items 72 and 84 here, helper Indio to Beaumont, 96 miles, the distance would be either 96 or 50 miles. I was just calling it to your attention. It is to my advantage, I suppose, to have the lesser mileage.

A. I don't think there is an error. However, we will check that.

[fol. 4121] Q. Section 12, delay to loaded cars. I think that is clear. And sections 13A and 13B and 14. Now, exhibits 214 and 215.

A. All right.

Q. Of course, the results which would appear in these exhibits, 215 is a graph of what appears on 214, that is correct, is it, so far as trains are concerned?

A. You might say that is a fact, but you cannot compute the figures shown on 215 from the information which is shown on 214.

Q. No.

A. The picture is the same, yes.

Q. Of course, with both of those exhibits, the results which are obtained would only be true if your redispatched, your assumed operation, works out as you have set it up. I mean, if there should be any change, if your engines failed to carry the tonnage for the rating which had been given to them for the rate of speed over this division which would change your redispatched, that could change the result of both of these exhibits, could it not?

A. To the extent that they would be changed they would be changed, yes.

Q. Everything has to work out just as you have assumed
[fol. 4122] it will in order to give this result.

A. If it doesn't, there is something wrong with our arithmetic here.

Q. Sometimes pencil points get wrong. Turn to Exhibit 220.

A. Yes?

Q. Looking at the actual at Wellton.

A. All right.

Q. There appears to be two meets there indicated on the actual, are there not?

A. Yes.

Q. Now, going to the assumed, will you tell me what is the difference between the actual and the assumed at that point?

The Court: You say this was at Wellton, Mr. Strouss?

Mr. Strouss: Yes, at Wellton. On the actual, let's see, S.S.W., what is that, 317?

A. Third, 17.

Q. And S.S.W. second, 17, G.B.W. 16 cross passenger train, line for train 6 at Wellton?

A. That is right.

Q. On the actual there are two meets indicated?

A. Yes.

Q. What is the difference between that and the [fol. 4123] assumed?

A. I can't tell by looking at this chart. We will have to look at our actual and redispatch train sheets, and see what time those trains got to Wellton.

Q. It appears to be about 5:30 according to this on both operations.

A. That is right—wait a minute, GBW16 and the redispatched gets to Wellton at about 5:20, whereas on the actual he got there at about 5:30, and SSW3rd 17, was right behind GBW16 and got to Wellton a little bit earlier on the redispatch than he did on the actual, which probably made it——

Q. (Interrupting) Doesn't the chart show an indication that the third 17, took the siding at Wellton?

A. He stopped there, I don't think he would have to go into the siding. This is at the end of the double track. Maybe 6 paused momentarily at Wellton in actual operation, to let those two trains come onto the double track.

Q. But he didn't pause in the assumed?

A. Maybe he didn't have to pause in the redispatch.

[fol. 4124] Mr. Strouss:

Q. C-413 on the actual, he left east yard about midnight?

A. That is right.

Q. And he had a meet coming out of the yard or just after he came out, or coming out of the yard as would appear there, is that right?

A. DF-3627, yes.

Q. That is eliminated on the assumed operation?

A. Yes.

Q. And it is eliminated by having 413 depart from the yard about twenty minutes or a half-hour later?

A. We don't have any DF-3627.

Q. No, you don't have any DF-3627 on the redispatch.

A. Maybe that train was eliminated entirely because we were running fewer trains on the redispatch than we are on the actual.

Q. Let's go over to Y-312 at east yard. On the actual there appears to be a meet but not on the assumed. What is the difference in the operation there, why did Y-312 passenger train meet at east yard in the actual and why isn't there a meet for those two trains in the assumed?

A. On the actual Y-312 had to stop at east yard in order to permit No. 1 to enter the double track. On the redis- [fol. 4125] patch he didn't have to stop there to permit No. 1 to enter.

Q. Both trains appear to have reached that point about the same time on both actual and redispatch according to this chart?

A. No, on the actual Y-312 left Yuma about 10:15 and arrived at east yard at approximately 10:40; but on the redispatch he left Yuma about 10:30 and arrived at east yard at almost eleven o'clock, maybe at 10:55.

Q. The meet, then, is eliminated in this instance by delaying his departure from Yuma about fifteen minutes?

A. That is the way it worked out. I don't propose to answer for what chief dispatcher Baker had in his mind when he set these things up, but I do recall his testifying that he established the leaving time of these trains from terminals and then his assistant took over and operated the trains out of the terminal. The departure times from the terminals depended on the arrival time of the trains

into Yuma and the amount of work that had to be done on the trains at Yuma. My own conclusion, or my opinion, is that Baker did not consider this for that particular feature when he set the departure time of that train for 10:30.

[fol. 4126] Q. Let's go to Gila. Under the actual there is a meet, C-414 and CY-414 with a drag freight, two meets there. Why isn't there a meet on the redispatch C-414-CY-414 in the drag freight?

A. On the actual DF-3660 spent from 9:50 approximately to 11:40, or an hour and fifty minutes, in Gila and departed immediately after the arrival of CY-414 which would indicate that he was held in Gila until both C-414 and CY-414 had arrived, but on the redispatch the Ajo drag arrived in Gila at 10:25 and departed at 11:40 approximately, having spent an hour and fifteen minutes there and departing perhaps twenty or twenty-five minutes after the arrival of C-414 and CY-414, indicating that he was not held in Gila until the arrival of that train but that he stayed there because of station work or some other reason.

Q. There wasn't a meet, then, between those two trains in the assumed?

A. There wasn't a meet in the sense that one train was delayed by the other, no.

Q. At Stockham I was wondering why it is not indicated as two instead of one meet with Y-314 and 315?

Mr. Mason: That is on the redispatch?

Mr. Strouss: Yes.

[fol. 4127] A. Second train 903 met Y-314-315 on the double track. You have a comparable situation although not with the same trains on the actual, at five P.M. where C-414 met DE-2521 on the double track or near the end of the double track and we didn't score a meet.

Q. Coming down to Drury on the actual it is at Benson, DF-3742 and C-415 met at Benson?

A. That is right.

Q. On the redispatch C-414 goes off the sheet just before it would meet the drag however?

A. That is right.

Q. The same is true of C-413 and the drag at Lisbon?

A. That is right, and there again you find counterparts on the actual. I call your attention to what happened at Bowie at twelve midnight, C-414 and DF-5014, the trains we are talking about.

Q. Now at Lordsburg CY-412 and the drag freight, the drag appears to have reached Lordsburg about 7:10 and CY-412 about ten or fifteen minutes after that?

A. Yes.

Q. Then, the drag left about a half-hour later?

[fol. 4128] A. That is right.

Q. CY-412 about three-quarters of an hour later?

A. Yes.

Q. Why was that not a meet?

A. Neither one of the trains was delayed by the other and we didn't score that for the same reason that we did not score what happened to DF-5027 or CY-411 on the actual at Lordsburg or C-412. No interference between trains, no meets in the sense that one train delays another train.

Q. Of course this exhibit and the results that are reflected would only be true if your redispatched or assumed operation worked out exactly as you assume that it will? I mean if there are any delays or engine failure.

A. We duplicated delays and engine failures, you know, and in doing that we were leaning over backward because we are going to operate less engines on the redispatch than we are on the actual, but we duplicated engine failures, failure for failure, we didn't take seven-tenths or eight-tenths of the number of failures.

Q. An AC-8 has never been operated on this territory?

A. Never in regular service, no.

[fol. 4129] Q. You have by your redispatch assumed that it will pull certain tonnage over this territory and make certain speeds, is that correct?

A. That is right.

Q. Of course if it should fail to do that year results here would be changed?

A. That is right.

Q. This graph in exhibit No. 222, as I understand from your testimony on direct examination, that is to show the minimum locomotives that would be required in order to carry out your operations during this period. In other words, twenty-seven locomotives would be the minimum that would be necessary for this operation?

A. That is right. This chart is set up with twenty-seven locomotives in actual operation and we added three more for shopping, giving us thirty.

Q. Your three would be more or less standby locomotives, is that what you mean by "shopping"?

A. Yes.

Q. You didn't attempt to make a graph for this in-and-out on this actual operation to see what that picture might have been?

A. No, but I did make a check of the requirements of thirty, based on locomotive-miles, checking it against the locomotives in actual performance and found that the [fol. 4130] number of units reduced in approximately the same ratio as the locomotive-miles actual against redispatch.

Q. From this exhibit and the next, No. 223, you appear to have assigned for redispatch thirty-three principal engines, is that correct? That is the total principal engines that you have, leaving out the south line?

A. Yes, thirty-three.

Q. What in the actual?

A. Corresponding to that thirty-three would be forty-five. There is involved in that also, see the note in column C, Section 4.

Q. Yes, that is what I didn't understand.

A. Helper service.

Q. In trying to calculate the locomotives in actual there, it appeared to me you had sixty-one principal locomotives and eight helpers in actual and thirty-three principal and fifteen helpers in the redispatch?

A. Where do you get the eight helpers?

Q. Five in item 2, Gila-Estrella helper, and three San Simon.

A. All right, and on the redispatch you gave us credit for five in the same territory, did you?

Q. Yes, and then there would be ten in the Tucson-[fol. 4131] Dragoon which would make thirty-three principal and fifteen helpers in the redispatch?

A. All right.

Q. If I figured this correctly, there are thirty-six principal engines shown Yuma, Tucson, via Gila and twenty-five Tucson, El Paso via Lordsburg, which would be sixty-one principal locomotives.

Mr. Mason: I think you are both working at cross purposes. Obviously that twenty-five you just mentioned in-

cludes the helpers between Tucson and Dragoon according to the note.

Mr. Strouss: That is what I am asking Mr. Sines. I want to find out how many principal engines were in the actual and how many helpers?

A. They don't work that way in actual operation. Sometimes they are in helper service and sometimes they are in principal service.

Q. You have sixty-nine locomotives in actual, leaving out the south line?

A. All right, sixty-nine.

Q. And forty-eight in the assumed?

A. That is right.

Q. What is the train-miles eliminated by the redispatch? You have that on one of your exhibits, do you not?

[fol. 4132] A. Yes, exhibit No. 226. The locomotive-miles eliminated, Mr. Strouss, for the north line, that is, from Yuma to El Paso, are 142,838 for the two months June and August, 1938.

Q. The locomotive-miles for the redispatch for the same period are 355,501?

A. Yes.

Q. The locomotives' decrease is twenty-one locomotives?

A. Yes.

Q. In determining the increase in locomotive investment, you have taken the total pounds of the twenty-one locomotives to be released and the total pounds of the new locomotives to be used, the AC-8's, and subtracted the pounds of the old locomotives from those AC-8's and multiplied that by a per pound price to determine the increase in investment, is that the way that works out?

A. That is right. Just a minor correction, that the other locomotives in the assignment on the redispatch are included here also, not only the new AC-8's but the old ones also.

[fol. 4133] Q. Yes. Now, why did you take away the weight of the 21 locomotives?

A. I didn't take it away. Don't you see how this works here?

Mr. Strouss: I thought I did. Don't you subtract?

Mr. Mason: That is why I think both the last question and answer are incorrect. Mr. Strouss' explanation of his understanding of the way the calculation is made is clearly

wrong from the face of the exhibit, and I don't think the witness understood the question or he wouldn't have answered as he did.

Mr. Strouss: Mr. Sines, how do you arrive at that amount, $284,149?

A. That calculation occurs in lines 9 to 16, columns G, H, I and J. We find that the total weight of locomotives in actual service is 31,731,800 pounds. The locomotives necessary on the redispatch are 32,872,960 pounds, and the difference in weight or the increase of the redispatched over the actual is 1,141,160 pounds. Multiplying that by the average price at which we are now buying locomotives gives $284,149.

Q. But you have added thirty new AC-8 locomotives weighing 22,614,000 pounds?

[fol. 4134] A. Yes.

Q. Purchased new?

A. Yes.

Q. But your increase in investment is only 24.9 cents a pound times 1,141,160; that is the difference or added pounds after putting the AC-8 locomotives in service here and taking out the 21 older type locomotives?

A. Yes, that represents the net change in locomotive weight and locomotive investment.

Q. Figured at the price today for locomotives?

A. Well, estimated 1940 price, yes.

Q. And the 21 locomotives which are removed from service here, the effect of that is to use them in reducing the pounds of locomotives put in service here?

A. Yes, it reduces the locomotives put in service here, also reduces our locomotive requirements on the system, we won't have to buy so many locomotives if we put these locomotives in service here in Arizona. We won't have to buy so many locomotives for our system requirements over the next ten years if we are allowed to put these big ones in service in Arizona. That is the theory behind this exhibit.

Q. Those older locomotives will be put in service on [fol. 4135] other divisions if they are taken off this division, that is what you mean by that, I take it.

A. Yes, sir, our locomotives are wearing out all the time.

Q. Now, has depreciation been given any consideration in this calculation?

A. The depreciation on the increased investment in locomotives?

Q. The depreciation on what is already in service?

A. Perhaps I can answer that this way. We have a depreciation rate here for our increased investment.

Q. But you haven't in considering these old locomotives in your investment account here, you haven't depreciated those? Has any consideration for depreciation been given? Maybe I can make clear what I am trying to get at. As I see this calculation here, you have put in service thirty new locomotives with a total pounds of 22,614,000. Now, that would mean an investment, in considering your old locomotives, that would mean an investment of 24.9 cents times 22,614,000 pounds, would it not?

A. Yes.

[fol. 4136] Q. But you have reduced that investment here by subtracting the weight of locomotives now in service?

A. That is right.

Q. And valuing those locomotives at the present cost price of your AC-8's?

A. That is right.

Q. And in valuing those locomotives in service, you haven't given any consideration to depreciation?

A. Well, I think I have, and I will tell you why I think I have. I am looking for that exhibit bringing together our investment. 225, I think it is. There is a locomotive depreciation rate indicated in column F of 2.9 per cent, and that is the depreciation rate which we charge in accordance with the Interstate Commerce Commission's accounting regulations, whether locomotives be new or old. The reason behind that is that a locomotive investment is a continuing thing. We retire old units and buy new ones; we are going to have to do that whether we set this law aside here in Arizona or whether we don't. If we are fortunate enough to take 21 locomotives that have seen some service here in Arizona away from Arizona to be used elsewhere, it is not going to cut that depreciation rate [fol. 4137] down anywhere or we haven't benefited at all in the general aspect so far as the Southern Pacific locomotive investment is concerned.

Q. But your depreciation here on 225 is, of course, taken on the $284,149 investment?

A. Sure. That is all we would be allowed to set up by the Interstate Commerce Commission.

Q. Your exhibit doesn't show when any of these locomotives now in service were purchased does it?

A. No.

Q. Nor the actual cost of those locomotives now in service?

A. No, it doesn't, although they cost much less than this 249 dollars when they were bought.

The Court: We will take our noon recess at this time until two o'clock.

(Thereupon the court stood at recess until two o'clock P. M. this day.)

[fol. 4138] 2 P. M., February 19, 1941

All parties being present as heretofore noted, proceedings were resumed as follows:

The Court: You may proceed.

B. S. Sixes resumed the witness stand.

Mr. Strouss:

Q. Mr. Sines, on your exhibit No. 224 the price of $3,414 per caboose, what is the basis of that price?

A. That is a price that was furnished by the mechanical department as being the cost of constructing steel cabooses.

Q. That is the present-day cost?

A. I think it is a cost that is a couple of years old, I don't know that we have built any steel cabooses lately. The last time we built any steel cabooses that was the price.

Q. The twenty-one cabooses which by your study would be unnecessary, you wouldn't just junk those, would you?

A. No, sir, we would use those cabooses some place else on this railroad and our total system requirements would be reduced by twenty-one cabooses.

Q. Then, of course, that does not necessarily mean [fol. 4139] twenty-one new cabooses?

A. Sure it does, over a period of years. If we have to maintain twenty-one cabooses in operation, we have to replace them at some time or other.

Q. If the law were to be set aside, under your exhibit this is the number of cabooses that you would not require for your operations; the cabooses that you were to take out of service certainly wouldn't be the newest cabooses that you have? If you were to retire a caboose, you would retire the old cabooses, would you not?

A. We wouldn't retire any cabooses. It is not a question of retirement, it is a question of deferring or not having to spend any money at all for new cabooses at some future date.

Q. Without any consideration for depreciation?

A. Yes, the depreciation is shown on cabooses as 3.27 per cent on exhibit No. 225 in column F. I might add, Mr. Strouss, I have handled caboose investment just like the locomotive investment. I have charged depreciation on one side and depreciation on the other side. One acts as an increasing investment and the other acts as a decreasing investment.

Mr. Mason:

Q. Is it investment or annual charges?

[fol. 4140] A. So far as depreciation is concerned, it is an annual charge.

Mr. Strouss:

Q. Will you turn to exhibit No. 249. This exhibit is a comparison of the Tucson division, Pacific lines, and the Salt Lake division to show the trend in freight train locomotive loading and its effect on fuel consumption?

A. Yes.

Q. Both main and branch line operations are included in this exhibit?

A. That is right.

Q. And the Pacific lines include both the Tucson and the Salt Lake divisions?

A. That is right.

Q. I notice on sheet 2 in column J pounds of fuel per thousand gross ton-miles in 1929 the figure was 98 pounds of fuel per thousand gross ton-miles and in 1930, 117 pounds?

A. Yes.

Q. That is an increase in that year of 19 pounds?

A. Yes.

Q. It was in November of 1929 that the Tucson division was extended, was it not?

A. No, July of 1930.

[fol. 4141] Q. So that at least for a part of the period of 1930 the operation between Tucson and Lordsburg enters into the computation?

A. If you will remember, Mr. Strouss, I explained that I took the restated figure for the year 1930 which was published in 1931 and which gives the comparison with the Tucson division as it existed for the entire year of 1931, so as far as these statistics are concerned there is a clean break there between 1929 and 1930. You don't have to concern yourself with the fact that that change occurred in the middle of the year.

Q. You mean the operation between Tucson and Lordsburg is included for the period in your computation here?

A. The operation from Tucson to Lordsburg was set up for the entire year of 1930 when the figures were restated in 1931.

Mr. Mason: May I interrupt, in order to make this clear, these figures for 1930 represent the statistics of the Tucson division as if it had included the 1931 limits throughout the year 1930?

A. Exactly.

Mr. Mason: Is that what you had in mind, Mr. Strouss?

Mr. Strouss: Yes. And the figures from there on [fol. 4142] through to the end of course would be of the division as it is now constituted, that is, including that section from Tucson to Lordsburg?

A. Yes.

Q. The addition of that territory would have considerable effect upon this problem of pounds of fuel per thousand gross ton-miles, would it not?

A. It did to the extent shown there in those figures in column J.

Q. Do you think from 1930 on is properly comparable on to the period ahead?

A. No, that is why I broke it and set this exhibit up as I did.

Q. The territory between here and Lordsburg brings in a considerable help district?

A. Two helper districts.

Q. As the result of that, there is the added locomotive-miles, the locomotive working as a helper and returning light?

A. Yes.

Q. Which adds to the fuel consumption?

A. Yes.

Q. And that all comes into this period beginning with 1930?

A. Yes.

Q. Would a difference in carloading have any bearing [fol. 4143] upon pounds of fuel per thousand gross ton-miles?

A. No, I would say that would be so remote that it would not have to be given consideration.

Q. There isn't any showing as to what the carloadings were in the different years over the period to say whether there was any variation in carloadings except as we showed this morning?

Mr. Mason: I think there is a showing.

The Witness: Mr. Mason had some exhibits. I guess we could compute, however, but it would be quite a job.

Mr. Strouss:

Q. Mr. Masson in connection with his exhibits Nos. 162, 163, and 164 I think in response to a question of the Court why he had not carried exhibit No. 163 back to 1930 stated it was because of the change in the divisions and he didn't think the period before that was comparable to the period after 1930.

A. That is right.

Q. Do you agree with him on that?

A. Insofar as the particular items that are considered on this exhibit, I agree with him and I repeat that is the reason I set up my exhibit as I did, I am speaking about exhibit No. 349.

Q. It is true as shown by exhibit No. 305 that over this [fol. 4144] period there has been quite a bit of change in both the main line and branch line mileage operated?

A. In mileages there has been, that is right.

Q. The branch line mileage in Nevada has been reduced from, what was the figure in 1923?

A. 303.

Q. To what in 1939?

A. 153.

Q. And there has been a reduction on the Tucson to some extent?

A. From 648 to 465. Part of the Nevada change was due to standardizing and reclassification on the branch line from the state line into Fernley, I think that is something like 60 miles. We made main line out of branch line in 1929.

[fol. 4145] Q. And, of course, the main line in Arizona at the beginning of the period was slightly under 400 miles with 144.93 miles of branch lines?

A. Yes. A moment ago, Mr. Strouss asked me what the branch line mileage had been in Arizona. Well, I read the figure 648 for the year 1924, and 1923 it shows 1444.93. In other words, there was an increase between 1923 and 1924 in Arizona.

Q. That was due to the merger, was it not, the acquisition of the Arizona Eastern Lines, which brought in a lot of branch lines?

A. Yes.

Q. And also some on the E.P. and S.W.?

A. Yes.

Q. Your assumed operation with the AC-8 locomotives, of course, the fuel cost would have to be considered with respect to the fuel used by that type of locomotive, would it not? I mean, for your assumed operations. I mean a larger locomotive will consume a greater amount of fuel ordinarily.

A. It does to move itself, that is right.

Q. You have some of these locomotives operating now, the AC-9's operating on the Rio Grande division?

A. Yes, they are coal-burners and they are operating [fol. 4146] between El Paso and Tucumcari.

Q. When did they go into service, in 1940?

A. In the fall of 1939.

Q. That operation did result in the reduction of helper and light locomotive-miles during the year 1940, did it not?

A. I don't think—well, I know we haven't any helper territory between El Paso and Tucumcari. It reduced locomotive-miles and train-miles a lot.

Q. Increased your cars per train?

A. Yes.

Q. You might, if you will, take the 521's for 1940, Rio Grande Division.

A. All right.

Q. That shows, does it not, that for the year 1940 there was 1,840,881 locomotive-miles principal.

A. 1,840,881.

Q. And for 1939?

A. 1,951,086.

Q. And in helper service?

A. In 1940, 3,053, and in 1939, 9,440.

Q. The total locomotive-miles, including principal, helper and light.

A. 1,885,278 for 1940, and 2,014,750 for 1939.

[fol. 4147] Q. Now, your cars per train, main and branch?

A. For 1940, 62.4, and for 1939, 55.9.

Q. Now, main line only?

A. Main line for 1940, 66.3; 59.2 for the year 1939.

Q. Now, on your No. 521's, pounds of fuel per gross ton-mile?

A. Main and branch 95.2.

Q. And for 1939?

A. Main and branch 94.6.

Q. Now, the ratios that you have computed here in your exhibit 249 are carried over into your next exhibit, 250?

A. That is right.

Q. Your exhibit 249 is on both main and branch line operations?

A. Yes.

Q. While you are applying that ratio to main line operations only now in exhibit 250?

A. Yes.

Q. And the same would be true of Exhibit 251?

A. Let us get back on that, the last couple of questions there.

(The last three questions and answer were read by the reporter.)

The Witness: I was mistaken, I should have said no.

[fol. 4148] Exhibit 250 is for the Tucson division, main and branch.

Q. You have no redispatch of any branch line operations, have you?

A. No, but I took the results of the redispatch for June and August, 1938, and applied them to the statistics of

June and August, 1938, and I found what the effect would have been on the entire Tucson division of setting up the same condition that would have prevailed if we had had long-train operation in Arizona, because that wouldn't have affected our branch-line operation in any way.

Q. You mean long-train operation wouldn't affect your branch-line operation?

A. No.

Q. Now, your locomotive repairs, exhibit 254?

A. All right.

Q. As I understood your testimony on direct examination, you took the record of locomotives of the different types from the entire Pacific lines except the territory between Roseville and Eugene, and Roseville and—what was the other?

A. Sparks.

Q. And Sparks. Is that right?

[fol. 4149] A. Well, that story is a little bit involved. The AC-6's which I testified to and which I think we all wrote in on our exhibits operated between Roseville and Sparks, and then I made a further study of the F-5's and I selected those F-5's which had spent all or most of the ten years of their existence in the territory between Roseville and Sparks and Roseville and Eugene, and compared that group of F-5's with those F-5 locomotives which had not operated in that particular territory.

Q. You stated the other day that you don't keep a record by division of locomotive repairs?

A. No, we don t.

Q. You formerly did?

A. Until 1932 we did.

Q. As shown by those earlier records, the amount charged to locomotive repairs on the Tucson division was lower than other divisions except New Mexico, Stockton and Salt Lake?

A. I don't know, I have never made that particular comparison.

Q. Of course, the divisions like the Western and the Coast division and the Shasta, locomotive repairs run higher up there than they do on the other divisions?

[fol. 4150] A. Well, it might have, but as I say, I don't know what we did have there. I notice this though, you said the Salt Lake division was lower than the Tucson.

Mr. Strouss: Yes, the Salt Lake division is lower than the Tucson. I found it was in 1926 that was the year I checked, per gross ton-mile; on the train-mile it was higher.

[fol. 4151] Mr. Strouss:

Q. Now, Mr. Sines, on exhibit No. 297, "Estimated Cost of a Terminal at the Arizona-New Mexico State Line," when was it decided to build that terminal?

A. I don't think we would ever build that terminal.

Q. What was the purpose of the exhibit?

A. As I understood it, it was to demonstrate what it would cost us if we were to reduce the extraterritorial effect of this law to a minimum in New Mexico and Texas by building a terminal as close to the Arizona boundary as possible.

The Court: Irrespective of the physical conditions that exist at the state line?

A. Yes, and irrespective of the train operation that would be entailed too.

Mr. Strouss:

Q. Of course it is only about three or three and a half miles from there to Steins which is the summit of the hill?

A. That is right.

Q. That is a pretty crooked territory there, too, isn't it?

A. It has curves.

Q. At Cavot where this terminal would be situated, it is pretty much on a curve?

A. That is right, there is considerable curvature there [fol. 4152] and I would never think of building a yard with that much curvature in it.

Q. A grade of 1.4 per cent?

A. That is right.

Q. It is only 22 miles into Lordsburg from Cavot?

A. That is right.

Mr. Strouss: That is all.

Redirect examination.

Mr. Mason:

Q. Following out the thought of Mr. Strouss, Mr. Sines, it would be perfectly easy to avoid the expense of building

a terminal at Cavot by running short trains into and out of Lordsburg, Wouldn't it?

A. He has limited himself to Lordsburg. We actually have run short trains to El Paso.

Q. The same way that if we wanted to avoid a violation of the law instead of building a terminal at the state line at Yuma, we could run them into and out of Indio, couldn't we?

A. That is right. I think you lawyers express that by saying it is a matter of degree.

Q. As a matter of fact, it is quite impracticable to build a terminal at Cavot in order to avoid the extraterritorial ef-
[fol. 4153] fect, isn't it?

A. Yes, I have said we probably never will build such a terminal.

Q. Insofar as the New Mexico boundary is concerned, it is impracticable, if not impossible, in a railroad sense, in an operating sense to avoid the extraterritorial effect of the law without violating it?

A. That is right.

Q. Just as it is at Yuma, I take it?

A. I would understand that, yes.

Q. Going back to some of your earlier cross-examination, insofar as the showing on exhibit No. 193 is concerned and particularly the showing of gross ton-miles per train-hour, does the relationship of the total number of empties to the total number of cars handled have any effect upon the showing of gross ton-miles, or, to state it another way, do I understand that a gross ton is a gross ton whether it consists entirely of the weight of an empty car or partly the weight of a loaded car and partly of the lading in the car?

A. That is right.

Q. Is your gross ton-mile showing affected either way by the percentage of empty cars to total of cars handled on either division?

[fol. 4154] A. No.

Q. In connection with this exhibit, or at the time you were being questioned in connection with this exhibit, Mr. Strouss suggested that some of your answers indicated that the longer and heavier trains do not or would not be operated as fast as the shorter trains compelled by the Arizona law. Did you intend any such inference by any of your answers?

A. No, you would have to look at the entire picture. With fewer trains and with less interference on the railroad, we will be able to have a better schedule performance than with

more trains and with greater interference. Under the second situation it means longer trains and larger power to handle those trains.

Q. With heavier trains would you use the same or heavier power?

A. We would use the heavier power, the power we have set up here.

Q. Now as to the showing of net tons per train, I think in this connection you were referred to exhibit No. 189 and I believe to some other showing which indicates there is a slight difference in the percentage of empties to total amount of cars handled as between the Tucson and Salt Lake [fol. 4155] divisions. Giving effect to that difference in percentage and giving effect likewise to the difference in loading per car to which your attention was directed from the form 521 which was stated to be higher on the Salt Lake division than on the Tucson division, will the combined effect of those two differences overcome the difference in net tons per train which is shown in the lower half of exhibit No. 193?

A. No, it would not, but I want to explain my answer. Perhaps you missed my answer to Mr. Strouss where I said I couldn't agree with him that that difference of empty cars on exhibit No. 189 would change the net tons per train appreciably, so, confining my answer simply to the difference in average tons per loaded car, the Tucson division showing would only increase by one block, it would still be out-distanced by the Salt Lake division which would be three and a half blocks higher for the year 1939.

Q. What is the primary factor, if you can state, which accounts for the difference between the net tons per train as between the Tucson division and the Salt Lake division as shown on exhibit No. 193?

A. The long trains run on the Salt Lake division and [fol. 4156] short trains compelled by the Arizona 70-car law are the principal factors having to do with the difference in the showing on exhibit No. 193.

Q. It was suggested to you that the Phoenix line was a light traffic line and that that might have some effect upon the Tucson division showing because it is included in this showing of main line. Does the light volume of the total freight traffic on the Phoenix line have any substantial effect here, and if so in what way?

A. Light volume has very little effect. The only thing that can affect these showings is the loading per train. The trains on the Phoenix line are somewhat lighter on the average perhaps than on the main line, but when you add it all up I doubt that you would ever notice it on this exhibit.

Q. Then this is a showing of train loading rather than volume or density of traffic on the main line itself, isn't it?

A. Sure, this is entirely a train loading exhibit. Incidentally, one thing that makes those light trains on the Phoenix line is the Arizona Train Limit Law. There are times when we could exceed the 70-car limit there.

Mr. Strouss: May I ask, do you have records that will give [fol. 4157] that Phoenix operation that we may have to examine?

A. It can be gotten.

Mr. Mason: We put in an exhibit of a redispatching study showing the length of trains on the Phoenix-Tucson run during the month of December, 1938, and as they could be increased if it were not for the law.

A. It would have to be worked up from basic data, that is, the conductors' wheel reports.

Mr. Strouss: What about your train sheets, wouldn't they show that?

A. Well, it would give you an indication but I wouldn't want to make a comparison between train sheet figures and accounting department figures for this item here.

Mr. Mason:

Q. On exhibit No. 198 you were asked about the tonnages of trains and I think you indicated that empty refrigerator cars were considered to have a weight of 53 M's?

A. 52 or 53, yes, something like that.

Q. And loaded cars were computed to have 93 to 95 M's?

A. 90 to 100, depending on the average of the particular train or trains that were being redispatched.

[fol. 4158] Q. I think you were referred to the form 521 for the year 1938 as showing an eastward loading on the Tucson division of 19.8 tons per car as I got the figure. Is that correct?

A. Something like that.

Q. What would 19.8 tons amount to in M's? Would it be approximately 40 M's?

A. Yes.

Q. What would that give as the average weight of the loaded car?

A. Forty and fifty-two would be ninety-two.

Q. You were asked also about variables and your answer was that the variables for the purposes of the redispatching study were computed in proportion as they bore on the actual to the basic amount of wages paid, is that correct, subject to certain constants?

A. May I have the question read?

(The question was read by the reporter.)

Mr. Mason: Perhaps I better withdraw and reframe the question.

Q. You show a certain amount of variable payments on exhibit No. 198 as paid to the train and engine crews on the actual operation?

A. Yes.

Q. For the purpose of the redispatched operation you [fol. 4159] computed the variable wages in a lump sum, didn't you?

A. Yes.

Q. How did you arrive at that lump sum?

A. That is demonstrated on exhibit No. 229 and can be explained by referring to the first three items in column D, the variable payments for actual operation were $1,373.95. The train-miles reduce in that district in the ratio of ninety-four thousand to sixty-eight thousand. I reduced the variable amount, $1,373, by the ratio 94 over 68 and obtained the amount in the redispatch cost line of $1,040.95.

[fol. 4160] Q. Why did you use the ratio of actual train-miles to redispatched train-miles to obtain the amount of the reduction in variable wages in the redispatching study?

A. Because those are items that vary with the number of crews operating, the time that they spend in getting their trains started from terminals and time they spend in tying up in away-from-home terminals, the time they spend away from home, and which is paid for as held-away-from-home-terminal time, if there be any, and over-time, and this method was as accurate as any that could be devised, in my opinion.

Q. Do the amount of train-miles made by train crews measure the opportunity for the occurrence of these services which are paid for by these variable amounts?

A. Yes.

Q. Do you find that in experience by checking days against other days in the actual operation?

A. I don't know that I went that far into it, but it is a fact that if they are not running, they are not going to have any opportunity to get any of these variable payments.

Q. Now, on exhibits 214 and 215, Mr. Strouss suggested that the factor of speed entered into the redispatch showing [fol. 4161] here. In other words, he said, as I recall his question, that each showing in so far as it related to redispatched operation, depended upon the redispatched trains operating with the loads, and making the speeds that were contemplated by the redispatching study. I want to ask you whether train speeds enter at all into the showing on exhibits 214 and 215.

A. There is no showing of speed on either of those exhibits.

Q. He also asked you, I think, in connection with these and other exhibits whether or not your showing for the redispatched operation did not depend upon the AC-8 locomotives performing in accordance with plan. Now, I want to ask you this: In the first place, does the Ac-8 locomotive resemble any other oil-burning type previously installed in service on the Southern Pacific lines?

A. Yes, AC-4's, 5's, 6's and 7's.

Q. How long has the AC-6 been in service?

A. Since 1930.

Q. Has it been in service in territory similar to or more difficult than Arizona?

A. Much more difficult than Arizona. Between Roseville and Sparks.

Q. Has it been used in other territories similar to Arizona [fol. 4162] in a general way?

A. No, not the AC-6's, the AC-6's have been confined to that one territory.

Q. Has the AC-8, since it has been placed in service, been used in territory similar to or more difficult than Arizona?

A. Yes, the AC-8's were used on the Coast lines.

Q. Between what points?

A. Between Los Angeles and San Luis Obispo; they have made a few runs between San Francisco and Bakersfield in passenger service, they have been used quite extensively for freight service between Los Angeles and Yuma.

Q. And between Los Angeles and Bakersfield?

A. Not in freight service, that has been confined to passenger service.

Q. Have the AC-6's been used in freight service between Roseville and Eugene?

A. There have been a few scattering trips up there, but not many.

Q. And the experience of the AC-6 extends over several years, does it?

A. Since 1930.

Q. Does the experience with the AC-4's and 5's extend prior to that?

[fol. 4163] A. Yes, the AC-4's were obtained in 1928 and 1929, and the AC-5's were also obtained in 1929.

Q. Mr. Sines, having that experience in mind, is there anything conjectural about the performance of AC-8's in service in Arizona?

A. No.

Q. Now, going to exhibit 305, because it happens to be the next one concerning which you were questioned, I think your attention was called to the fact that there was a considerable reduction in the branch line mileage in Nevada over the period covered by the exhibit. I want to ask you, in the first place, if a large part of that reduction is not due to the abandonment of narrow-gauge mileage in Nevada?

A. Yes.

Q. Do you recall what the extent of the service on the narrow-gauge was?

A. I think it was tri-weekly, down one day and back the other.

Q. Did that accumulate any substantial amount of train-miles or car-miles as compared with the total of the Salt Lake division?

A. No, that would never be noticeable in any statistics.

Q. Now, some of this other was due to the abandonment [fol. 4164] likewise of the Moundhouse branch?

A. Yes.

Q. Was that likewise a line of infrequent service?

A. Yes; some of that mileage had only on call service, meaning that trains might not go down there for several months.

Q. Would that accumulate train-miles or car-miles to any extent, compared with the total of the division?

A. No.

The Court: We will take our mid-afternoon recess.

(Thereupon, a short recess was taken, after which the witness B. S. Sines was recalled to the stand, and proceedings were resumed as follows:)

Mr. Mason: Mr. Sines, does the abandonment of branch lines of light traffic volume account similarly for the reduction in the branch line mileage in Arizona, as it is indicated over the period shown on Exhibit 305?

A. Yes.

Q. You have participated, have you not, in some of those branch-line abandonment cases?

A. Yes, that is right, many of them.

Q. And whether or not those branch-line operations were [fol. 4165] continued or abandoned, would the effect be substantial upon the ton-mile, train-mile, and car-mile figures, for the state or for the entire division?

A. No, it would have very little effect.

Q. In your cross-examination you were asked to refer to the form 521 figures for 1940 and 1939 having to do with fuel consumption on the Rio Grande division. Now, I will ask you first of all whether those form 521 figures that you read have to do with the division as a whole or with only that part of the division over which the AC-9 locomotives are regularly operated?

A. The figures that I read include the entire Tucson division.

Q. The Rio Grande division, wasn't it?

A. The Rio Grande division.

Q. Would that include the lines west of El Paso as well as the district between El Paso and Tucumcari?

A. Yes, west of El Paso on both lines, Lordsburg to El Paso and Tucson to El Paso.

Q. Now, are the AC-9's regularly operated in freight service west of El Paso?

A. No.

Q. Do the figures which you have read necessarily indi- [fol. 4166] cate the results of the performance of the AC-9's in and of themselves?

A. No.

Q. Do you know, and, if so, will you state whether any special study of the performance of AC-9's in the territory between Lordsburg and El Paso was undertaken?

A. No special study was undertaken, but in connection with some water tests that we were making, we ran two of these big coal burners between El Paso and Lordsburg for a number of trips.

Q. Did you make a study of their fuel consumption on those trips?

A. And that gave me an opportunity to make a comparison between the fuel consumption of those locomotives and the fuel consumption of the locomotives which were operating alongside of them at the same time.

Q. Have you the results of that study here?

A. Yes.

Q. This was a special study of these particular trips, was it?

A. Yes, there were about eighteen round trips that were made by these AC-9's in February, 1940.

Q. What was the fuel consumption per thousand gross ton-miles registered on these trips with the AC-9's, and [fol. 4167] how did it compare with that of the locomotives in regular service in the same territory?

Mr. Strouss: May we have the basic records on that?

Mr. Mason: I think it was a special study.

The Witness: The source records, Mr. Strouss, were the fuel tickets for those nineteen round trips.

Mr. Strouss: Is this a regular operation, a regular train operation?

A. Oh, yes, these locomotives handled trains; the average loading of the AC-9 locomotives eastward and westward was 3,291 tons. The average loading of the F-3's and 4's which were operated at the same time was 2,685 tons. They handled big trains. There was an increase in the load per locomotive of 22.6 per cent, that is, the AC-9's load was 22.6 per cent greater than the F-3's and F-4's.

[fol. 4168] Mr. Mason: Mr. Sines, were the trains longer when handled by the AC-9's on the average than were handled by other locomotives in the same territory at the same time?

A. Yes, in relation to that tonnage. I didn't have the number of cars per train but it would be something in the ratio of 22.6 per cent greater.

The Court: Did I understand you to say these AC locomotives were used in a regular run across the state of Arizona?

A. No, between El Paso and Lordsburg.

Mr. Mason:

Q. On the Rio Grande division?

A. Yes.

Q. But they were handled as regular trains?

A. That is right.

Q. Not special test trains?

A. No.

Q. What were the fuel consumption figures per thousand gross ton-miles for those AC-9's on those trips?

A. The AC-9's consumed fuel at the rate of 109.1 pounds of fuel per thousand gross ton-miles and the F-3's and F-4's which were operating at the same time consumed fuel at the rate of 115.6 pounds of fuel per thousand gross ton-miles. The fuel economy, therefore, was 5.63 per cent.

[fol. 4169] Mr. Strouss: Would you repeat the tonnage?

The Court: The reporter can read it back to you if that will suffice.

Mr. Strouss: It is back a little ways.

The Witness: A 3,291 tons for the AC-9's and 2,685 tons for the F-3's and F-4's.

Mr. Mason:

Q. That was the average train tonnage, not in M's?

A. In tons, this is, yes. In that connection I would like to call attention to exhibit No. 251, my fuel economy exhibit in the territory between Lordsburg and El Paso. I have heretofore testified that Nos. 249, 250, and 251 are exhibits which are all tied in together bearing certain relationships one with the other, and I set them up as best I could so the relationships would be consistent. The fuel economy that I have just testified to during this period in February, 1940, indicates a fuel economy of 5.63 per cent, when the loading increased 22.6 per cent. On exhibit No. 251, as a result of the redispatched study of June and August, 1938, the loading would have increased 25.5 per cent and I claim a fuel saving of 7 per cent, the 7 per cent being comparable to the 5.63 per cent I have spoken of before.

Q. Mr. Strouss also referred in his cross-examination [fol. 4170] of you on the form 521, Rio Grande division, to the reduction in helper service, I think it was from some eight thousand miles to some three thousand miles for the year. Where are helpers employed on the Rio Grande division?

A. Well, you know I couldn't figure out where that might have happened.

Q. Would it be on the Dawson branch perhaps?

A. I don't know. It is a very infrequent operation. It might have been on the branch or it might have been on the main line, I don't know. It only represents for the year 1940 one-sixth of one per cent of the total locomotive-miles.

Q. I seem to recall that between Douglas and Bisbee and Douglas and Bisbee Junction there is sometimes helper service or someone testified that some of those westbound trains have to be helped once in a while?

A. That could happen, I don't know.

Q. Now as to exhibit No. 254 concerning which you were questioned, I understand that these figures are system figures of shop repairs for these various types of locomotives for the ten-year period?

A. That is right.

Q. And include all divisions, the valley divisions and the [fol. 4171] Tucson division and the mountainous divisions and all the others referred to by Mr. Strouss?

A. Yes, the division basis doesn't enter into this exhibit No. 254 at all.

Q. Mr. Strouss also suggested to you I think that locomotive repairs when they were kept by divisions showed a somewhat lower figure per unit locomotive or train-mile. I take it he had in mind on the Tucson division rather than on certain other divisions which he mentioned. If AC-6's or AC-8's were used on the Tucson division, would you expect the repair cost per locomotive-mile to be lower than for the AC-6's and AC-8's used between Roseville and Sparks?

A. Yes.

Q. You spoke also in your cross-examination of having made a study of a certain number of F type locomotives which were used predominantly in mountain service and a certain number of locomotives of the same type which were used predominantly in valley service?

A. Yes, sir.

Q. What period was covered by that?

A. Ten years, 1930 to 1939.

Q. How many locomotives used in mountain service were [fol. 4172] studied?

A. There were eight and fifteen but I can't remember how they were placed, whether it was fifteen in the valley or eight in the valley.

Q. What was the relationship or the difference in the repair rate as between the mountain locomotives and valley locomotives?

A. The valley rate was 11.6 per cent lower than the mountain rate.

Q. That would be in line with the experience suggested by Mr. Strouss on the Tucson division for the year 1926 as compared to some other divisions, would it?

A. Yes.

Mr. Mason: I think that is all.

Mr. Strouss: I have no further questions.

The Court: You may step aside.

Mr. Mason: Subject to the right which we should like to have understood, and I don't suppose there will be any question about it however to meet and reply to any new matter which the State may offer in its case, the defendant rests.

Mr. Strouss: I had intended to state to the Court somewhat at length our position at this time but there are one or two recent cases which I would like to refer to the Court [fol. 4173] and for that reason I would like, if the Court will permit, to file a brief typewritten statement, serving counsel with copies of course, of our legal position so far as the case is concerned and I will do that within the next week.

It is our contention—I will just briefly state the points that we have in mind—so far as this law is concerned, in the field of train length legislation that until Congress has occupied that field the State has the right to enact laws regulating the length of trains; that Congress has not occupied the field, and, therefore, the State had at the time the law was enacted and still has the right to legislate with respect to length of trains.

Third, insofar as the question of the constitutionality of the Act with relation to the Interstate Commerce Commission provisions of the Federal constitution and the fourteenth amendment, if there is any rational basis for the enactment of the law by the State under its police power, it must be sustained as against both objections, that is, that if violates the commerce clause or that it violates the four-

teenth amendment, notwithstanding it may affect or burden interstate commerce.

[fol. 4174] The Court: That is under its police powers?

Mr. Strouss: Yes, under its police powers. That its constitutionality is not to be determined by weighing in the judicial scale the merits of the legislative enactment, but by the determination as to whether or not there is any rational basis to sustain the law, and, fifth, the legislature, the people in this instance since this was a referred measure adopted by the people, is presumed to have acted upon a rational basis in enacting the law and the burden is upon the defendant to prove that the law is without rational basis, without reasonable grounds for its enactment.

Briefly, those are the points upon which we make our contention that the law here is a valid law and properly adopted by the State. There are a number of cases; one case that is clearly recent which states our position I think quite fully is the case of South Carolina State Highway Department against Barnwell Bros. in 303 U. S. at 117.

The Court: You don't have the Law Edition citation?

Mr. Strouss: I don't have the Law Edition. It is 58 Supreme Court, 510. It that case—I am not going to take time now to read at length because as I have asked the [fol. 4175] Court I would like to state our position by written memorandum and in that will include the citation of this case and in doing so I will try to get the Law Edition citation, I think I can do that. This was a case where the constitutionality of a South Carolina law limiting the width and weights of trucks on highways was questioned on the ground that it invaded a field of interstate commerce already occupied by Congress by the enactment of the Federal Motor Carriers Act and that it violated the commerce clause by imposing an undue burden on interstate commerce and violated the fourteenth amendment because it took property without due process of law, so as the Court will see the very points which are involved in the case before this court were before the Supreme Court of the United States in this case of the highway department against Barnwell Bros. and in that case the Court in quite clear language pointed out what is the function of a court in passing upon the constitutionality of a law. That it is not the province of the Court to weigh the policy of the law but to determine solely the question of whether there is a ra-

tional basis for the adoption by the legislature of an enactment of the law. That if there is any rational basis whatsoever, if the matter is debatable, then the constitutionality must be sustained and that the legislature is presumed to have acted upon a rational basis in enacting a law and, unless it is shown to the contrary, the presumption will carry to sustain the constitutionality. I will not go any further with that case because in giving the memorandum I will cite it and probably will quote from it.

[fol. 4176]

The Court: That memorandum will be in the nature of an opening statement of the State's position?

Mr. Strouss: Yes.

The Court: Coupled with what you have stated here today?

Mr. Strouss: Yes.

Mr. Mason: I don't know that it is incumbent upon the defendant to state its position, but I can state it perhaps from memory, without referring to any memorandum.

[fol. 4177]

In the first place, we believe that the regulation of lengths of interstate trains and thus of interstate commerce moving in interstate trains is a field which even without any declaration by Congress belongs to the Federal government exclusively under the Commerce Clause and that the field of regulation into which the Arizona Train Limit Law enters is an exclusive Federal field. We think the decisions of the Supreme Court sustain our position in that regard with respect to this particular character of regulation and the particular subject matter which is regulated. But we say, as a second point, that even if this be a field in which the State is permitted to regulate, that the regulation here undertaken is not merely the incidental regulation of interstate commerce which a state may reasonably undertake or may properly undertake but this is a direct regulation of commerce not merely within the state boundaries but a laying of hands, if you please, upon interstate commerce as it approaches Arizona, while it crosses Arizona, and after it has left Arizona. In other words, that there is a direct and

[fol. 4178]

inescapeable extra-territorial operation of the law which cannot be avoided, physically speaking, in so far as our company is concerned, because it is impossible, or at least wholly impracticable, impossible in a sense of relative expense to construct terminals exactly at the state line

in which the reconsisting of trains may be undertaken. Therefore, the company faces the alternative of either operating its trains into the state under sufferance and there reconsisting them so as to meet the restrictions of the law, as it does at one boundary, or operating its trains to a terminal outside the state and there reconsisting them as it does at the other boundary. In the one case, it faces the peril of a multiplicity of prosecutions. In the other case it submits to the extra-territorial burden for a distance of at least eighteen miles, and in some cases a distance of 164 miles.

Besides the point of regulation, in an exclusive Federal field, a regulation outside the boundaries of Arizona, both of which, of course, are forbidden by the Commerce Clause, we have the point that this is a regulation of commerce within Arizona far beyond the incidental effect and that [fol. 4179] there is likewise an imposition of constant, substantial and continuing burden upon interstate commerce. And we think in that respect the evidence is clear and indisputable that the law imposes delay and interference and imposes very substantial burdens in a financial sense upon the conduct of interstate commerce from, to, within and across Arizona.

Now, if it can be argued that this is a field of regulation into which the State may enter in the absence of regulation by Congress, and I understood that to be the contention of counsel for the State, or in other words, if it be argued that this is a joint field which either may enter and which the State may properly enter in the absence of regulation by Congress, then we ask, what is the field, and the answer must be, and we assume that it is, that this is a regulation by the State in the interests of safety, and particularly, it is an undertaking by the State to regulate trains to those lengths which can safely and adequately be controlled. If that is so, then we point to the fact that the Congress has already entered the field by having legislated as to safety in having passed the Safety Appliance Acts and the safety [fol. 4180] sections of the Interstate Commerce Act and delegated to the Interstate Commerce Commission powers of regulation and enforcement in that field, and the Congress having entered the field of such regulation the State is forbidden to make any regulation in that field because it is elementary that where Congress has entered a particu-

lar field the State can neither supersede nor supplement nor amend a Federal regulation.

Finally, we say that all other considerations apart, this regulation of length of trains can be supported, if at all, purely as a safety measure. It certainly is not supportable on any other ground, and I don't know from my experience in other train limit cases, I don't know of any other excuses being offered for a train limit law, and I don't imagine that counsel for the State intends to offer any other substantial reason for the enactment of this statute. In the preceding cases, certainly no other substantial reason was offered. If this law be considered then as an attempt to regulate in the interests of safety, in the first place it is based upon conditions as they existed in 1912 and previously because it was enacted and approved in 1912, and so far as we know has never been reconsidered. It is elementary again that a [fol. 4181] law which may be reasonable, which might have been reasonable under one set of circumstances may become wholly unreasonable and unjustified as conditions change. We think that we have shown and we think it can hardly be disputed that conditions have very greatly changed in the twenty-nine years since the first enactment of this law, but if it were undertaken to enact this law today it would still be wholly unjustified because experience has demonstrated, we think, beyond the shadow of a doubt that this law is wholly ineffective as a safety measure, that it does not promote the safety of men, or the safety of trains or the safety of passengers, or the safety of anyone; that instead of resulting in increased safety and the reduction of accidents, it greatly contributes to an increase in accidents and casualties and in damage to railroad equipment and property.

We think that the experience of the operations under this law, especially since 1923 when long-train operations were undertaken in other territories and couldn't be undertaken in Arizona as shown, that the 70-car limit or a 14-car limit as the case may be, is productive of increased hazard and whereas in other territories, particularly in one territory [fol. 4182] where substantially similar, or almost identical conditions exist, the casualty rates have been declining and have continued to decline markedly, and the casualty rates in Arizona have declined much less and the law not only does not prevent accidents but it actually contributes to their happening.

So that on all of the grounds which I have recounted, the law must be held unconstitutional as in violation of the Commerce Clause because of its invasion of an exclusive federal field, its inevitable extra-territorial effect, its regulation of commerce within Arizona as well as without, the heavy and disproportionate burdens which it imposes on interstate commerce, its invasion of a field which Congress has itself occupied and therefore occupied to the exclusion of the State and, finally, because if ever it could have been justified, it certainly is not now justified in the light of experience as an appropriate regulation in the interest of safety.

The Court: Mr. Strouss, so there be no misunderstanding when we do reconvene the only matter or matters that you are reserving the right to present further documentary evidence is the introduction of additional certified copies [fol. 4183] of the Interstate Commerce Commission, is that right?

Mr. Strouss: No, these are the ones I was referring to.

The Court: Just what is it that you intend to take up under your right of cross-examination of the defendant's witnesses?

Mr. Strouss: So far as Mr. Sullivan is concerned, I don't remember now that there is anything, I think that was the only thing I had left.

The Court: In other words, you are all through now with your showing on your cross-examination of the defendant's witnesses?

Mr. Strouss: Yes, with the exception that Mr. Sines is to bring in some matter.

The Court: Yes.

Mr. Strouss: But so far as any cross-examination, asking them any questions, I am finished.

The Court: You are through.

Mr. Strouss: Yes.

The Court: The record may show that the hearing in this case will be recessed until Wednesday, April 9th, at ten A. M.

(Thereupon the court stood at recess until April 9, 1941, at ten o'clock A. M.)

[fol. 4184] April 9, 1941 ten o'clock A. M.

All parties being represented at heretofore noted, proceedings were resumed at this time as follows:

The Court: You may proceed.

Mr. Mason: Your Honor, with the concurrence of the opposition, we are going to put on some additional or substitute evidence for the defendant.

The Court: All right.

Mr. Mason: This is in accordance with the agreement just prior to the close of the hearing and some discussions we have had in the meantime with Mr. Strouss. We will call Mr. Sullivan. Your Honor will recall that at the close of the previous sessions, Mr. Sullivan stated that the annual accident bulletin of the Interstate Commerce Commission for the year 1939 had just become available, and it was then proposed to bring down to date so as to include the year 1939 certain exhibits relating to national casualty statistics which included only the year 1938.

The Court: Yes, I recall the agreement.

Mr. Mason: And to substitute those exhibits in the record for the exhibits which included only 1938.

[fol. 4185] John J. Sullivan was recalled to the stand, and testified further as follows:

Redirect examination.

By Mr. Mason:

Q. Have you prepared now, Mr. Sullivan, a series of exhibits which you will identify by number in substitution for those which were previously of record and which included only the year 1938 as to statistics taken from the annual accident bulletins of the Interstate Commerce Commission?

A. I have.

Q. Will you identify those exhibits by number and produce the substitute exhibits?

A. Nos. 262, 263, 264, 265, 266, 267, 268, 269, 272, 273, and No. 293.

Mr. Mason: Your Honor, we ask that the substitute exhibits which have been identified by number and which have been distributed be received in evidence in lieu of the exhibits with the same numbers previously introduced, and that the exhibits with the same numbers be withdrawn and deleted from the records.

The Court: Any objection, Mr. Strouss?

[fol. 4186] Mr. Strouss: I have no objection to the substitution, except that I do want the record to show that any objection that was made to the original exhibits also runs to these substituted exhibits.

The Court: The record may show the State's objection, and that it is overruled and the substitution may now be made.

Mr. Mason: I want to ask you about these exhibits, Mr. Sullivan. Are they identical with the exhibits of the same numbers which have now been withdrawn and for which they are substituted, except for the addition of the year 1939 in each case?

A. Yes, with the further qualification that the total for the last period now includes five years instead of four, and where a grand total is shown there is a corresponding correction, and there has been some change in the figures representing the calculations of decrease one period with another, all of which however result from the inclusion of the statistics for the year 1939.

Q. You have recomputed the totals in each case for a period of five years, 1935 to 1939, instead of a period of [fol. 4187] four years, from 1935 to 1938, have you?

A. That is correct.

Q. And then a grand total for a seventeen-year period, 1923 to 1939, instead of a sixteen-year period, 1923 to 1938?

A. That is correct.

Q. And your comparison of average casualty rates where such comparisons appear are of the two six-year periods ending in 1928 and in 1934 respectively, and the five-year period ending in 1939, instead of two six, and one four-year period?

A. That is right.

The Court: There is no change in the figures for the year 1938 and previous years?

A. None whatever.

Mr. Mason: The exhibits are in the same form as the ones for which they are now substituted?

A. They are.

Q. And present exactly the same corresponding statistics for 1939 as for previous years?

A. That is correct. It should not be overlooked also, that in the course of my testimony in referring to comparison of average casualty rates, I believe in some cases I referred to the item number or line number without any further description, and of course in those cases there has [fol. 4188] been a change in the item or line number resulting from the inclusion of the year 1939.

Q. I take it, then, in that respect, the substituted exhibits would be self-explanatory?

A. That is correct.

Mr. Mason: Do you have any questions, Mr. Strouss, as to the substituted exhibits?

Mr. Strouss: No questions.

Mr. Mason: Your Honor will also recall that on the last day of the preceding session, there were introduced some copies of certain Bureau of Safety investigation reports covering accidents on railroads other than the Southern Pacific, the certified copies having become available only on the last day. They had been referred to previously in Mr. Sullivan's discussion, but had not become available. They were intended for use, I believe, in Mr. Sullivan's cross-examination.

Mr. Strouss: That is correct.

Mr. Mason: And were introduced, I take it, as part of that cross-examination.

Mr. Strouss: Yes, of course, merely for the purpose of having him identify the five accidents as accidents which were included in the exhibit which Mr. Sullivan presented.

Mr. Mason: We have also obtained certified copies which [fol. 4189] were not available at that time, of five accident investigation reports of the Interstate Commerce Commission corresponding to the five investigation reports, although not as to the same accidents, of course, which form Exhibit 311, and since Mr. Sullivan is on the stand and this is the first appropriate time at which they could be introduced, we offer as part of his redirect examination and as responsive to the exhibit 311, which Mr. Strouss introduced, these five copies of the investigation of the five accident reports.

Q. Have you brought those reports, Mr. Sullivan?

A. I have handed them to Mr. Strouss for examination.

Q. Have you spare copies?

A. I have not.

Mr. Strouss: Is there any way of getting these except sending in for them?

A. I have all of them except one on the way? and I think possibly I will be able to obtain extra copies of that.

Mr. Mason: You expect to be able to supply extra copies?

A. Yes.

Mr. Strouss: I have no objection.

[fol. 4190] Mr. Mason: We ask that they be marked for identification as Exhibit No. 312.

The Clerk: Defendant's Exhibit No. 312 for identification.

The Court: There being no objection, they may be admitted in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 312 in Evidence.")

[fol. 4191] Mr. Mason:

Q. Mr. Sullivan, will you take up in their order the five reports which jointly form exhibit No. 312 and state briefly their numbers and the railroads, dates and locations?

A. Report No. 1935——

Q. By the way, I should ask you this——

Mr. Strouss: Pardon me, what is the number of this exhibit?

Mr. Mason: No. 312.

Q. Do those reports relate to accidents which are included within the scope of your exhibit No. 270?

A. Yes, and one of them is included in No. 271.

Q. That is, exhibit No. 270 is the freight train accident exhibit and No. 271 is the passenger train accident exhibit?

A. That is correct.

Q. Will you proceed as to 1935?

A. Report No. 1935 covers the derailment of a freight train of 66 cars due to the failure of an arch bar truck on the Pennsylvania Railroad at Cly, Pennsylvania, on September 9, 1934, as a result of which the adjacent track was damaged, causing the derailment of a 107-car freight train, the wreckage of this second train striking a passing freight train consisting of 57 cars on a third track.

[fol. 4192] Reports Nos. 1975 and 1976 cover two accidents on the Chicago, Rock Island & Pacific Railway, one at

Tiffin, Iowa, and one at Ottawa, Illinois, both on April 4, 1935. The train involved in the accident at Tiffin consisted of 18 cars and when it derailed due to a broken arch bar truck it struck another freight train standing on the siding and derailed and damaged the equipment in that train. The accident at Ottawa involved a freight train of 27 cars which was due to the collapse of the side frame of an arch bar truck, the wreckage following an adjacent track and was struck by a freight train of 53 cars moving in the opposite direction on the adjacent track.

Report No. 2050 covered the derailment of a freight train of 39 cars on the Chicago, Rock Island & Pacific Railway near La Salle, Illinois, March 3, 1936, due to the condition of the fourteenth car in the train which permitted the greater weight to be carried on the right side and allowed an excessive rocking motion of the car when aggravated by track conditions, the wreckage following an adjacent track and being struck by a freight train of 57 cars traveling in the opposite direction on an adjacent track.

[fol. 4193] Report No. 2069 covers an accident of a 57-car freight train which occurred on the Southern Railway near Efland, North Carolina, June 11, 1936, caused by a run-in of slack.

Report No. 2430 covers the derailment of a passenger train consisting of 8 cars due to excessive speed on a sharp curve on the Baltimore & Ohio Railroad near Clarion Junction, Pennsylvania, on June 5, 1940, the derailment being followed by a side collision with a freight train consisting of 59 cars moving in the opposite direction on an adjacent track.

Mr. Mason: That is all for Mr. Sullivan.

Mr. Strouss: I would like a chance to read these reports before I release him.

The Court: The Court will grant you that right, Mr. Strouss.

Mr. Strouss: There are one or two questions I would like to ask now and it might be I will have further questions.

[fol. 4194] Recross-examination.

By Mr. Strouss:

Q. These are accidents which were included in the exhibit made from the abstract of reports of the investigation of the Interstate Commerce Commission?

A. Yes, they were made from what are described as the Quarterly Summaries of the Interstate Commerce Commission.

Q. Quarterly abstract of the summaries?

A. I don't recall the reference to any abstract. It is referred to as the Quarterly Summary.

Q. These are the complete reports as made by the investigator?

A. There is this distinction, the reports that I have just referred to in the record are the reports of the Director of Safety to the Interstate Commerce Commission. Exhibits Nos. 270 and 271 previously introduced were compiled from the quarterly summaries of the investigation of accidents by the Interstate Commerce Commission as a body. The summaries, of course, are prepared from the individual accident reports.

Q. They are summaries of the Director's reports, are they not?

[fol. 4195] A. Yes.

Q. And these are the complete reports?

A. They are the complete reports of the Director of Safety, not the complete reports of the Interstate Commerce Commission.

Q. They are the complete reports of the Director of Safety, are they not?

A. That is correct.

Q. And the reports which you have and from which your exhibit is made is a summary of these reports?

A. I think it can properly be described as that. That is not the title, however, of the Interstate Commerce Commission publication from which I prepared exhibits Nos. 270 and 271.

Mr. Strouss: That is all.

Redirect examination.

By Mr. Mason:

Q. Exhibit No. 270 is prepared from documents issued by the Commission itself in print, is it not, over the seal of the Commission?

A. That is correct.

Mr. Strouss: These reports here are also issued by the Commission itself over its seal, are they not?

[fol. 4196] A. They are at the present time, within the last year, but previously they were not. I have noticed in some of the reports received during the past few months that they are now issued over the seal of the Commission but that was not the procedure previously.

Mr. Mason: Subject to Mr. Sullivan being recalled for further questioning after Mr. Strouss has examined those, that is all we have at this time.

The Court: You may step aside.

(Witness excused.)

Mr. Mason: Your Honor, Mr. Strouss prior to the adjournment asked us to supply certain information and there was also some few incidental omissions which we should like to supply by recalling Mr. Sines at this time. I may say that the testimony which we are now to introduce through Mr. Sines has been submitted in outline form to Mr. Strouss previously. That is correct, isn't it, Mr. Strouss?

Mr. Strouss: Yes.

[fol. 4197] B. S. Sixes was recalled as a witness in behalf of the defendant and having been previously sworn testified further as follows:

Redirect examination.

By Mr. Mason:

Q. Will you refer to your exhibit No. 194, Mr. Sines? I believe you were requested, either off the record or during the course of your cross-examination by Mr. Strouss to prepare a supplementary exhibit or furnish supplementary information which would show the classes and numbers of employees of the Tucson division for each of the calendar years 1930 to 1940, inclusive, covering only those employees classed in the transportation division?

A. That is right.

Q. Have you prepared such an exhibit?

A. I have.

Mr. Mason: We ask that this statement which has just been distributed be marked "Exhibit No. 313" for identification.

The Court: It may be marked for identification.

The Clerk: Defendant's exhibit No. 313 for identification.

[fol. 4198] Mr. Mason:

Q. Was exhibit No. 313 for identification prepared by you or at your direction, Mr. Sines?

A. It was prepared at my direction.

Q. From what sources?

A. From our accounting department copies of I. C. C. Wage Statistics, Forms A and B, "Monthly Report of Employees, Service, and Compensation." The reports themselves are monthly reports and in order to comply with the annual figure we added the sums of the twelve monthly reports and divided by twelve to get the average annual figure.

Q. This exhibit, I take it, was prepared in the same manner as exhibit No. 194 but is restricted to the particular classes of employees which are shown in lines 20 to 38 of that exhibit?

A. That is right, in accordance with Mr. Strouss's request.

Q. Has the exhibit been checked and compared?

A. It has.

Q. Will you say whether or not it is true and correct?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

[fol. 4199] Mr. Strouss: No, I have no questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 313.

Mr. Strouss: No objection.

The Court: It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 313.")

Mr. Mason:

Q. Mr. Sines, I believe you were also requested by Mr. Strouss to obtain and furnish in exhibit form information as to the freight tonnage ratings of Santa Fe locomotives over those portions of its line between Needles, California, and Clovis, New Mexico?

A. That is right.

Q. Have you obtained the information as to such tonnage ratings?

A. I have.

Q. And compiled then in the form of an exhibit?
A. Yes.
Q. Is that statement now before you?
A. Yes.
Q. Entitled, "Freight Tonnage Ratings of Locomotives between Needles, California, and Clovis, New Mexico"?
A. That is right.

Mr. Mason: We ask that this statement be marked "De-
[fol. 4200] fendant's Exhibit No. 314" for identification.
The Court: It may be marked.
The Clerk: Defendant's Exhibit No. 314 for identification.

Mr. Mason:

Q. From what sources did you obtain this information?
A. This information was obtained as a result of correspondence between myself and Mr. Mahoney and the two assistant general managers of the Santa Fe in whose districts these locomotives operate. Mr. Strouss and I agreed that we could handle this in this manner rather than calling a Santa Fe witness back to identify and testify as to accuracy.

Q. I take it, then, we will have no objection on the ground of hearsay?
Mr. Strouss: No.

Mr. Mason:

Q. Is this exhibit No. 314 for identification an accurate reproduction of the information furnished you by the Santa Fe officials?
A. Yes, sir.
Q. I notice on the line "Gonzales to Winslow" and likewise on the line "Riordan to Winslow" you show under
[fol. 4201] tonnage rating "CL." What does that mean?
A. Those districts are in Arizona and are also on sections of railroad where the gradient is descending in the direction indicated and the number of cars permitted by the Arizona car limit controls the tonnage ratings of the engine.
Q. I notice that Gonzales is actually in New Mexico. Is that approximately the Continental Divide?
A. It is the summit on that part of the railroad. I suppose it could be the Continental Divide.

Q. Other than on those two lines, the ratings are shown in tons rather than in M's as in the case on the Southern Pacific, is that correct?

A. Yes, sir.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 314.

Mr. Strouss: I have no objection but I would like to ask a question or two.

The Court: The exhibit may be introduced in evidence.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 314.")

[fol. 4202] Mr. Strouss: When you say that the tonnage rating between Riordan and Winslow is the car limit, of course, if you had an engine on an ascending grade where the tonnage rating was such that the number of cars to make up that tonnage would exceed the car limit, you wouldn't say the car limit controlled the tonnage rating of that engine, would you?

A. No, but this is all descending grade, in accordance with my understanding of the Santa Fe profile that is in evidence.

Q. But I notice that you bring in the car limit law as rating the engine, which really isn't the fact, the train-limit law has nothing to do with the rating of an engine, does it?

A. On any ascending grade, it doesn't, no.

Q. Well, it doesn't on a descending grade; it may limit the number of cars you can pull, but it doesn't have anything to do with the tonnage rating of the engine, does it?

A. I don't think you could properly say that engines are rated down hill.

Mr. Mason: I think we can both agree, Mr. Strouss, that the train limit law is based upon the number of cars and has nothing to do with the tonnage rating of the engine.

[fol. 4203] Mr. Strouss: That why I couldn't understand about that in this exhibit.

Mr. Mason: Mr. Sines, isn't this the way it is furnished to you and isn't this the way it is published by the Santa Fe?

A. I don't know whether they publish it or not; this is the way they gave it to me.

Mr. Strouss: That is all.

Mr. Mason: Now, Mr. Sines, have you before you a statement in one sheet entitled, "Redispatch Study—Locomotive Mileage, Yuma, Arizona to El Paso, Texas, for Period June and August, 1938?"

I have.

Mr. Mason: May we have this statement marked Defendant's Exhibit 315 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 315 for identification.

Mr. Mason: Did you prepare this statement, Mr. Sines?

A. It was prepared under my direction and supervision, and has been checked by me.

Q. From what sources has it been prepared?

A. From the actual and the redispatch train sheets in the first instance, and checked against the white work sheet A in the second instance.

[fol. 4204] Is it related to or does it correspond to any exhibit based upon the redispatching study previously in evidence?

A. Yes, it is related to Exhibit No. 226.

Q. Exhibit No. 226 shows the total locomotive miles in Column D, both actual and redispatch, for the period June and August, 1938, for the districts between Yuma and El Paso, excluding the Phoenix line. Now, does this relate to the same territory and the same locomotive-miles?

A. Yes.

Q. I take it then that this is simply a break-down of the locomotive-miles as to classes of locomotives?

A. That is right. The figures in line 11 of Exhibit 315 will be found in Section 11 of Exhibit 226 in Column D.

Q. And the figure in line 13, is that found also on Exhibit 226?

A. In Section 13.

Q. Is this exhibit a true and correct reflection of the underlying sources that you have mentioned?

A. It is.

Mr. Mason: Any questions, Mr. Strouss?

Mr. Strouss: The figures shown in column C, your redis-[fol. 4205] patch locomotive-miles, of course, those figures

depend upon your redispatch working out the way that you assume that it will, your assumed operation?

A. That is right.

Q. And the same would be true of the savings which you show in line 12, that if your assumed operation doesn't work out as assumed, why, that figure wouldn't be what you have there; isn't that true?

A. That is right. I want to make this plain, too. When I answer that way, that if the redispatching fails to work out in exactly the same manner as our study did, of course, those figures would be changed, but only to the degree that it did fail to achieve the results of our study.

Q. But to that degree it would be changed?

A. Yes, and furthermore, as far as I am concerned, I cannot say whether the savings would be greater or less. I think this is a good figure.

Mr. Mason: Have you any further questions?

Mr. Strouss: No.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 315.

Mr. Strouss: Objected to as irrelevant and immaterial, and purely speculative.

[fol. 4206] The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 315.")

Mr. Mason: Have you a statement, Mr. Sines, similar in form to No. 315, but relating to the period April 4th to April 30th, 1940, actual operations, compared to redispatched operation, with no restriction and using A. C. power and long sidings?

A. I have.

Mr. Mason: We ask that this statement be marked "Defendant's Exhibit No. 316 for Identification."

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 316, for identification.

Mr. Mason: Will you refer to a prior exhibit, Mr. Sines, and state whether or not Exhibit No. 316 corresponds to it?

A. Yes, Exhibit 316 contains figures the same as those appearing on Exhibit 242.

Q. What do you undertake to show with respect to the figures which appear on Exhibit 242 by the showing on Exhibit 316 for identification?

A. The total locomotive-miles in column D, Section 11, [fol. 4207] of Exhibit 242, are broken down by classes of locomotives on Exhibit 316.

Q. From what sources did you obtain the breakdown on Exhibit 316?

A. From the actual and redispatch train sheets and the white work sheet A.

Q. Was this Exhibit 316 prepared in the same manner and along the same lines as No. 315?

A. It was.

Q. And is based upon the April 1940 redispatching study?

A. Yes.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: Questions which I asked you concerning Exhibit 315 if applied to Exhibit 316, column C and line 11, your answer would be the same if those questions were applied to this exhibit?

A. Yes.

Mr. Mason: Have you any other comments before the exhibit is offered, Mr. Sines?

A. No.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 316.

Mr. Strouss: Objected to as irrelevant and immaterial, and speculative.

[fol. 4208] The Court: The objection is overruled. It may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 316.")

Mr. Strouss: May I ask just one question concerning Exhibit No. 315?

Q. In line 13, the ratio of 17.89 per cent to 100, what is that taken from?

A. That will be found on the bottom of Exhibit No. 229.

Mr. Mason: There may be other places in which the development of that ratio appears, but that happens to be one.

Mr. Strouss: I thought it should be connected up.

Mr. Mason: Yes, it should be.

Q. The ratio was predicated, as I read Exhibit 229, upon the relationship between the total traffic expressed in gross ton-miles handled during the two months of June and August, 1938, and the total handled in the year 1938 over the lines covered by the exhibit?

A. That is right.

Q. Now, turning to a statement which has been circulated, Mr. Sines, have you before you a statement in one sheet entitled, "Redispatch Study—Locomotive Shop [fol. 4209] Repairs, Yuma, Arizona, to El Paso, Texas, for Period June and August, 1938?"

A. I have.

Q. Was this prepared under your supervision, or by you personally?

A. This was prepared by me personally.

Mr. Mason: May we have this statement marked No. 317 for identification?

The Court: It may be marked.

The Clerk: Defendant's Exhibit No. 317 for identification.

Mr. Mason: From what sources was No. 317 prepared, Mr. Sines?

A. The figures in columns B and E are taken from Exhibit 315, and the figures in columns C and F are taken from Exhibit 254, except as to the figure in column F, line 10, which is the result of the computation indicated at the bottom of the sheet in Exhibit 317.

Q. Now, you show a basic figure in the computation at the foot of the sheet. Does that figure appear on Exhibit 254 as that exhibit was corrected during the course of its introduction?

A. Yes, that is an addition that I made to 254.

[fol. 4210] Q. Appearing as line 8 on the exhibit?

A. That is right.

Q. As expanded in the course of its introduction?

A. That is right. The next ratio on Exhibit 317—

Q. Appearing in the computation at the foot of the sheet?

A. Yes,—is weight ratio of the two locomotives, the upper one being for the AC-8, the upper figure being the

weight of the AC-8, and the lower figure being the weight of the AC-6.

Q. In thousands of pounds on drivers?

A. Yes—pardon me, in tons of total weight of locomotive.

Q. Now, what is the source of the factor contained in the parentheses?

A. That is the relationship to which I testified on the last day of the hearing before our last adjournment, and in which I explained that locomotives in valley service, the locomotives which I had studied which were in valley service accumulated repair rates, which were 11.6 per cent lower than similar locomotives which had been in mountain service.

Q. Now, I take it that the summations which are found [fol. 4211] in line 11 are of the preceding figures which appear in the lines above?

A. They are.

Q. And the figure in line 12 is obtained in what way?

A. Subtracting the figure in column G, line 11, from the figure in column D, line 11.

Q. And the figure in line 13, column G, is obtained how?

A. Is made in the manner indicated by expanding 17.89 per cent to 100 per cent.

Q. In the same fashion as on other exhibits where the factor or ratio 17.89 per cent has ben used as explained by you previously?

A. That is right.

Q. Have you used any sources other than exhibits and testimony already of record in the preparation of this No. 317?

A. No.

Q. Is the exhibit true and correct?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: This is based, I take it, on the locomotive-miles savings as shown on the previous exhibits?

[fol. 4212] A. Yes, the previous exhibit 315.

Q. Exhibits 315 and 316, do they include helper locomotive-miles as well as principal engine miles?

A. Yes.

Q. Where there are double-headers, it would include the locomotive-miles of both engines?

A. That is right, all the locomotives in main line freight service for the periods stated.

Q. It wouldn't include switch engines, however?

A. No.

Q. It would include road engines doing switching work while out on the road?

A. Yes.

Mr. Strouss: That is all.

Mr. Mason: Would it include all light engine-miles as well?

A. Yes.

Mr. Mason: We offer the exhibit in evidence as Defendant's Exhibit No. 317.

Mr. Strouss: Same objections as to the two previous exhibits.

The Court: The objections are overruled. It may be admitted.

(Thereupon, the document referred to was received in [fol. 4213] evidence and marked "Defendant's Exhibit No. 317.")

Mr. Mason: Mr. Sines, there is one feature of this exhibit perhaps you didn't mention, in the title you show the words "Locomotives shop repairs."

A. That is right.

Q. Does this exhibit purport to cover the cost or saving in cost as to all classes of locomotive repairs?

A. No.

Q. I will ask you to refer, if you will, please, to Exhibit No. 257.

A. Yes.

Q. Now, having in mind the title of this exhibit "Locomotives shop repairs," will you explain the significance of that feature of the title in that feature of the showing on Exhibit No. 317, having before you Exhibit 257 as well.

A. We are able to accumulate for individual classes of locomotives only the shop repair costs. There are other locomotive repair costs called "running repairs," which we do not allocate to individual types of locomotives, but

which is dependent upon the service the locomotive is in, and when comparing types of locomotives, should compare the relationship and size and weight and power of the locomotives. Exhibit 257 indicates what the relation has been [fol. 4214] between shop repairs and total locomotive repairs.

Q. Do you undertake, on exhibit No. 317, to make any showing at all of running repairs for these locomotives?

A. No, but the next logical step beyond Exhibit 317 is to expand the figure in line 13 by 55.5 per cent to see what the total of both running and shop repairs would be.

Q. You say expanded by 55.5 per cent, how would that be done?

A. By dividing the figure in line 13, column G, by 55.5 per cent to find out what 100 per cent or all the locomotive repairs would be.

The Court: We will take our mid-morning recess.

(Thereupon, a short recess was taken, after which the witness was recalled to the stand, and proceedings were resumed as follows:)

[fol. 4215] Mr. Mason:

Q. Mr. Sines, have you a statement similar in form to No. 317 bearing the title, "Redispatch Study, Locomotive Shop Repairs, Yuma, Arizona, to El Paso, Texas, for period April 4th to April 30th, 1940"?

A. Yes.

Q. "Actual Operation Compared with Redispatched Operation with No Restriction and Using AC Power and Long Sidings"?

A. Yes.

Q. Was this prepared in fashion similar to exhibit No. 317?

A. The same.

Q. What sources were employed in its preparation?

A. The figures in columns B and E are taken from exhibit No. 316. The figures in columns C and F come from exhibit No. 254 and the computation made at the foot of exhibit No. 317 and columns D and G are computations of the preceding two columns.

Mr. Mason: Your Honor, before we discuss the exhibit further, I neglected to have it marked. May it now be

marked for identification as defendant's exhibit No. 318?

The Court: It may be marked.

[fol. 4216] The Clerk: Defendant's exhibit No. 318 for identification.

Mr. Mason:

Q. Now as to the derivation of the figure in line 9, column F, is that the same figure already explained in connection with exhibit No. 317?

A. It is.

Q. Otherwise do the comments already made in connection with exhibit No. 317 apply equally to exhibit No. 318 for identification?

A. That is right.

Q. Is the exhibit true and correct as a reflection of the underlying sources which you mentioned?

A. It is.

Mr. Mason: Have you any questions, Mr. Strouss?

Mr. Strouss: No questions.

Mr. Mason: We offer the exhibit in evidence as defendant's exhibit No. 318.

Mr. Strouss: The same objections.

The Court: The objections are overruled, it may be admitted.

(The document referred to was received in evidence and marked "Defendant's Exhibit No. 318.")

Mr. Mason:

Q. Mr. Sines, does exhibit No. 318 bear any relation, and [fol. 4217] if so what relation, to exhibit No. 255?

A. Its indication is the same as the indication on exhibit No. 255. Exhibit No. 255 shows the saving in locomotive shop repairs which were made during the period April 4th to April 30th when long freight trains were run in Arizona and adjacent territory. Then exhibit No. 318 indicates the additional savings in shop repairs which were available if we had run longer freight trains and if we had used the large AC power and had extended the sidings.

Q. Can you obtain from exhibits Nos. 318 and 255 any idea of the saving in shop repairs as between short train

operation under the law and long train operation with long sidings and AC power?

A. Yes, adding the figures together.

Q. Adding the figure in line 10 of exhibit No. 255 and line 11 of exhibit No. 318?

A. That is right, it will give an indication of the savings which are available by adoption of long train operation.

Q. Referring to exhibit No. 255, I notice that the title reads, "Locomotive Repairs." Is that title precisely accurate?

A. No, the word "shop" should be inserted to read "Loco-[fol. 4218] motive Shop Repairs."

Mr. Mason: If there is no objection, we should like to have the record copies changed accordingly and ask also that counsel change their copies so as to insert the word "shop" after the word "locomotive" and before the word "repairs" in the first line of the title.

The Court: The correction may be made.

Mr. Mason:

Q. Is there any other comment on exhibit No. 318?

A. No other comment.

Q. Mr. Sines, will you refer, please, to exhibit No. 220, an enlarged copy of which appears on the easel showing train movements between Yuma and El Paso on June 18, 1938?

A. Yes.

Q. You will recall in your cross-examination it was suggested that the chart was possibly in error in its indication of certain train meets at Wellton made by train No. 6?

A. That is right.

Q. Have you made a check of the chart and of the actual train sheet for that day?

A. I have.

Q. Will you say whether or not the showing of two train meets by No. 6 and the two passing freight trains at Wellton [fol. 4219] at approximately five-thirty on June 18, 1938, is correct or whether there should be a different showing on the exhibit?

A. The exhibit is incorrect in showing two meets; there should only be one meet shown.

Q. That is on the actual, is it?

A. Yes.

Q. And the figure "2" then which appears in the line opposite Wellton and Asher for train No. 6 and the westward freight trains should be deleted, is that correct?

A. That is right.

Q. What change, if any, does that make in the summation which appears at the foot of exhibit No. 220?

A. That would reduce the total 254 to 253.

Q. Would it reduce the total 232?

A. Yes, that would be 231.

Q. Calling your attention to exhibit No. 298, did you in compiling exhibit No. 298 rely upon exhibit No. 220 to plot any of the points in the chart on sheet No. 2?

A. I did. On sheet 2 there is indicated the number of meets and passes which occurred in actual operation on June 18th directly beneath the title.

[fol. 4220] Q. It shows the figure "254" there?

A. The figure 254 would become 253.

Q. You show upon the plot on June 18th a dot within a circle. Did you move that point?

A. Yes, that goes down one unit or half a square on this particular scale.

Q. Does that have any effect upon your equation or formula that you show opposite the curve line on sheet 2?

A. No, the effect of this change on the equation and the location of the line on the chart is inappreciable. I computed it to see exactly what difference there would be and found that I couldn't compute any difference practically because it only would reduce meets and passes that you read off the chart by one-tenth and in reading the meets and passes in columns E and I on the sheet No. 1 of exhibit No. 298 we read it to the nearest even number.

Q. Would you compute the difference then of your figures in columns E and I by reason of this change?

A. No.

Mr. Strouss: Did your rule fail you this time?

A. No, it was beyond the reach of my slide rule.

[fol. 4221] Mr. Mason:

Q. I think the question was asked you as to the segregation of service as between main and branch lines within the two states of Arizona and Nevada. Have you made a study of the records to enable you to give that segregation?

A. I have had figures compiled which will segregate train-miles and car-miles between main and branch line service for the states of Nevada and Arizona.

Q. For what year?

A. For the year 1940.

Mr. Mason: Those are figures for which you asked, Mr. Strouss?

Mr. Strouss: I didn't remember, Mr. Sines was in error on his page I think.

A. I gave a page reference in this memorandum which is incorrect. I am not sure that Mr. Strouss asked for that specifically but it came up as a result of my cross-examination and on my cross-examination, as I recall, I read the segregation for the Salt Lake and Tucson divisions but we wanted to bring it within state boundaries and I said I would undertake to get those figures. The train-miles for Nevada, main line, in 1940 were 1,952,586; branch lines, 93,508. The car-miles for Nevada, main line, were 163,430,040 and branch [fol. 4222] lines were 1,051,932. The train-miles for Arizona for 1940, main line, were 2,539,843; branch lines, 230,548. Car-miles, Arizona main line, were 150,439,093 and branch line 5,472,113.

Mr. Mason:

Q. I think some reference was made in certain of your exhibits to a change in division limits which occurred on the Tucson division in July, 1930. Will you describe just what changes were made in division limits at that time and how the divisions in Arizona were affected?

A. Prior to July, 1930, we operated three divisions east of Yuma, Arizona. The New Mexico divisions extended from El Paso east to Tucumcari; the Rio Grande division extended from Tucson to El Paso via both north and south lines and the Tucson division extended from Yuma, Arizona, to Tucson, Arizona. In July, 1930, we consolidated the New Mexico division with the Rio Grande division and gave to the Tucson division that part of the Rio Grande division which extended from Tucson to Lordsburg. The limits between the Tucson and Rio Grande divisions are now located at milepost 1145 on the north line approximately three miles west of Lordsburg and at milepost 997 on the south line approximately fourteen miles east of Tucson.

Q. Between Tucson and Mescal there are presently alter-[fol. 4223] nate tracks, are there not, one eastward and the other westward?

A. Yes.

Q. To what divisions do those belong?

A. The westward track belongs to the Rio Grande division and the eastward track belongs to the Tucson division.

Q. Does the westward track belong to the Rio Grande division all the way into Tucson or only as far west as milepost 997?

A. Only as far west as milepost 997.

Q. I think also there is some question in the record as to the runs of passenger train crews in the territory between Los Angeles and El Paso. Will you explain what the limits of the runs of the passenger train crews are?

A. Yes. Passenger train crews, meaning conductors, brakemen, flagmen, and baggagemen, operate from Los Angeles to Yuma, from Yuma to Tucson via both Gila and Phoenix and from Tucson to El Paso via both Lordsburg and Douglas. The engine crews, consisting of engineers and firemen, operate over the same districts with the exception of the two districts east of Tucson where both the engineer and fireman change at Lordsburg and Douglas.

[fol. 4224] Q. As to freight train crews, what are the freight terminals between Los Angeles and El Paso?

A. The freight terminals are Los Angeles, Indio, Yuma, Gila, Phoenix, Tucson, Lordsburg, Douglas, and El Paso.

Q. Do both trainmen and enginemen on freight trains change at those points?

A. They do.

Q. Will you refer to your exhibit No. 226 and also to exhibit No. 236 and No. 242. I think it was stated generally in the course of your testimony in the redispatch study, and this would apply likewise to the testimony of the dispatchers that the same trains were handled in the redispatch as were handled in the actual?

A. Yes.

Q. For example, on sheet 2 of exhibit No. 226 in note No. 1 you refer to a decrease of 612 engine water cars. Will you explain that? Did you in the redispatch study eliminate the use of the auxiliary water-carrying car which is used in short train operation?

A. Yes, we did that because the tender of the AC-8 locomotive is so much larger than the tender of the locomo-

tives now in service that it made it unnecessary to haul the [fol. 4225] water cars. Our statement as to having handled the same business on the redispatch as was handled in actual operation was true generally as you said with respect to commercial business and company freight.

Q. And including empties?

A. Including the movement of empty cars. There was just this one detail that I thought should be explained.

[fol. 4226] Q. Does a similar explanation apply to certain eliminations of water, engine water cars, that is, the auxiliary water tender on Exhibits 236 and 242?

A. That is right.

Q. I think the record is fairly clear as to the extent of helper districts in the affected territory between El Paso and Los Angeles, but I am not sure that it shows those helper districts west of Yuma. Are there helper districts on the Los Angeles division between Los Angeles and Yuma?

A. Yes.

Q. And where?

A. Eastward the helper district is from Colton to Beaumont, and westward from Indio to Beaumont.

Q. Are those freight helper districts?

A. Yes, and when the passenger trains exceed certain limits, they are also passenger helper districts.

Q. I think it has been testified that the locomotives now in use in Arizona have been or presently are in use in Nevada. Can you say whether or not locomotives now in use in Arizona both east and west of Tucson are also in use in California, and if so, where?

A. That is right. Thinking of the locomotives as classes, [fol. 4227] the locomotives in service on the Tucson division will also be found on the Los Angeles Division with the exception of the F type locomotives, and they are in service on other California divisions, such as the Coast division, Western division, Sacramento division.

Q. And the San Joaquin division?

A. No, there are no F type locomotives presently assigned to the San Joaquin.

Q. Are the S. P. type locomotives in service on California divisions?

A. They are, particularly the Los Angeles division.

Mr. Mason: That is all.

Recross-examination.

By Mr. Strouss:

Q. You say that those helper districts in California are helper districts for passenger trains when they exceed a certain limit. What is that limit?

A. It is ten or eleven cars, ten with some trains, and eleven with other trains.

Mr. Strouss: That is all.

Mr. Mason: I want to say, Mr. Strouss, we appreciate your courtesy in permitting us to put in this supplemental [fol. 4228] information. Some of it was, I think, in answer to your suggestions, but other of it was not.

Mr. Strouss: Mr. Sullivan has given me copies of the exhibits which were introduced.

Mr. Mason: Oh, yes.

Mr. Strouss: I will try to look those over during the noon hour.

The Court: Do I understand, then, Mr. Mason, that the defendant now rests in this case?

Mr. Mason: Yes, the defendant rests.

[fol. 4229] Rebuttal

Mr. Strouss: May this be marked for identification? It is a book entitled "Southern Pacific Company, Pacific Lines, Airbrake Rules and Regulations."

The Court: It may be marked.

The Clerk: Plaintiff's Exhibit No. 319 for identification.

Mr. Strouss: Now, I have a book bearing the title, "Southern Pacific Company, Pacific Lines, Rules and Regulations of the Transportation Department, June 15, 1930." May that be marked for identification?

The Court: It may be marked.

The Clerk: Plaintiff's Exhibit No. 320 for identification.

Mr. Strouss: Now, I understand from Counsel, that counsel for the defendant will stipulate that these are the rules of the Southern Pacific Company in effect at the present time. They were given to me by Mr. Sines.

The Court: I take it, Mr. Strouss, that while you are having them marked and will offer in evidence the entire book or pamphlet of the rules, it is understood that only such as you or opposing counsel see fit to refer to will be-[fol. 4230] come part of the record?

Mr. Strouss: That I intended to suggest when I made the offer.

Mr. Mason: I think the books which have been marked for identification, Plaintiff's Exhibits 319 and 320, are the current issues of the books, 319 being the Airbrake rules and regulations, and 320 the rules and regulations of the Transportation Department effective, as to the Airbrake book, on February 1, 1939, and as to the Transportation rules and regulations, on June 15, 1930. The latter have been amended, and the amendments are apparently pasted in in the proper places.

Mr. Strouss: In order to be sure that we have these, I will call Mr. Sines as a witness; if there is any question about that, I want to know what I am offering.

The Court: I understood Mr. Mason to admit that they were.

Mr. Mason: I said that I thought they were. I have no other information than that about them.

The Court: Mr. Sines, those books are full and complete, and contain the rules now effective on the defendant's railroad?

A. (By Mr. Sines) That is my understanding; they were [fol. 4231] given me by our local people here in Tucson. I can't testify about the rules or anything like that.

The Court: The Court will assume, Mr. Strouss, that those are the full and complete rules.

Mr. Strouss: They were given me under the request that they produce the rules. I will offer in evidence Plaintiff's Exhibit No. 319 for identification, with the suggestion, as the Court has suggested, that whatever parts of the exhibit are desired to be used be indicated.

The Court: No objection, I assume.

Mr. Mason: No objection.

The Court: It may be admitted in evidence.

(The document referred to was received in evidence and marked, "Plaintiff's Exhibit No. 319.")

Mr. Strouss: I offer Plaintiff's Exhibit No. 320 for identification.

The Court: It also may be received in evidence.

(The document referred to was received in evidence and marked, "Plaintiff's Exhibit No. 320.")

The Court: The court will be at recess until two o'clock.

(Thereupon, the court stood at recess until two o'clock P. M. this day.)

[fol. 4232] April 9, 1941, Two O'Clock P. M.

Proceedings were resumed at this time as follows

The Court: You may proceed, Mr. Strouss, with the rebuttal.

TRACE H. COOPER was called as a witness on behalf of plaintiff, and being first duly sworn testified as follows.

Direct examination.

By Mr. Strouss:

Q. State your name, Mr. Cooper.

A. Trace H. Cooper.

Q. Where do you live, Mr. Cooper?

A. Needles, California.

Q. What is your business?

A. Locomotive engineer.

Q. Will you please tell the Court your experience in railroading?

A. I have been on an engine now for some thirty-seven years, thirty-one of it on the Santa Fe at Needles as fireman and engineer. Prior to that, some four years with the B & O, S. W. in Indiana, and a couple of years on the L. & N. in Kentucky.

[fol. 4233] Q. How long have you been an engineer?

A. Since August, 1916.

Q. And all of that time has been with the Santa Fe?

A. Yes, sir, continuously.

Q. You were fireman on the Santa Fe prior to that?

A. From November, 1909, to August, 1916, as a fireman.

Q. What type of service have you run in, passenger or freight?

A. Freight service, mostly.

Q. Have you been in passenger service at all?

A. Oh, I have handled some passenger trains, but I have never had a regular assignment in passenger service.

Q. What territory have you worked?

A. Over the entire Arizona division, that is, from Seligman, Arizona, to Bakersfield, California, and down to Parker, Arizona.

Q. Down to Parker?

A. Arizona, yes, sir.

Q. You have, as an engineer, operated trains over all of that territory?

A. Yes, sir.

Q. What territory are you working in now?

[fol. 4234] A. I am working on the second district of the Arizona division; that is between Needles, California and Barstow, California.

Q. Have you an assigned run there?

A. A freight run, cut-out pool freight run.

Q. What length trains are you handling as an engineer on the Santa Fe?

A. Well, I have handled all the way up to better than a hundred cars.

Q. What is about the longest train you have handled?

A. I have handled them up to probably 110 or 112 cars, one I believe of 112 cars I handled out of Barstow. That is quite a while ago.

Q. Will you tell the Court what the duties of a locomotive engineer are, starting at the time you are called.

Mr. Booth: You mean on the Santa Fe or the Southern Pacific?

The Witness: I think the duties are about the same.

Mr. Mason: The witness is not qualified to answer the question as to the Southern Pacific so far as his qualifications indicate now.

Mr. Strouss: He can testify as to what the duties of an [fol. 4235] engineer are on the railroad he operates on, certainly.

The Court: You may proceed.

A. Well, in his preparatory time for his trip it is necessary, after he is called, that he register out in the proper form on the government sheet, register his watch, compare it with the registered clock there, or certified clock, then his duties take him to the roundhouse to prepare his engine for his trip. It is necessary that he examine all work reports, such things as that, and inspect his engine, and see that it is in proper condition for the trip, and see that it has the necessary supplies and tools, and oil his engine around. By that time, generally, the brakeman is after you to put you on the train, then you go out and couple on to your train, the conductor will probably show up later with your

orders, you will read and compare your orders with the conductor, also compare time with him; then, if everything is clear, and you have the authority, you are ready to proceed after you make your necessary air tests and things of that kind.

Q. Then, when you are on your run, what are the duties of the engineer?

A. Well, he has many duties on his run, the operation of [fol. 4236] his locomotive, and keeping his eyes open for any obstructions; making his different meets, such things as that.

Q. What about block signals?

A. Oh, he has to watch for all block signals; they are spaced about a mile apart, all block signals, look out for a flag along the track or any obstructions.

Q. Do you have any duties with respect to observing the train itself?

A. At all times it is an engineman's duty to keep a sharp lookout for any defect in the train, as well as trainmen.

Q. Of course, the operation of a locomotive is an important duty, I imagine?

A. Very important duty.

Q. How is that operated?

A. I don't just get your question.

Q. Are there gauges and throttles and things of that sort?

A. You mean you want me to start in?

Q. Yes.

A. Well, in operating your locomotive, the first thing to do is to know that you have a right to move, and in the next case get your brakes released and have everything in the clear, the cylinder cocks open and open your throttle gradu- [fol. 4237] ally and get your engine to moving. If you have a train behind you, the attempt is to start as gently as you can until you get the entire train in motion, and then you can give her the gun.

[fol. 4238] Q. Now when you have a train moving, how do you stop it?

A. Generally a train is stopped by the use of the brakes, the air brakes, but of course a condition might be such on an ascending grade where we would make a gravity stop without the use of brakes.

Q. Is the operation of an air brake a part of the duty of the engineer?

A. Yes, sir.

Q. What, if anything, must the engineer know about the construction of the air brake equipment?

A. He is required to pass a certain examination to qualify him as an engineer and he must know certain things about the air brake in order to be able to operate it successfully.

Q. Your test for promotion includes an examination of your knowledge of the construction of air brakes?

A. Yes, sir.

Q. Are you familiar with the Santa Fe green book which is in evidence here as exhibit No. 152?

A. Yes, sir.

Q. That has in it I have noticed a description of the construction of brakes and their operation. Are you required [fol. 4239] as an engineer on the Santa Fe to be familiar with that part of the green book?

A. Yes, sir.

Q. Are you examined when you are up for promotion?

A. Yes, sir.

Q. How about firemen?

A. A fireman takes his examination in three courses, his first, second and third year examinations. The first two don't have very much regarding an air brake but the third one, that is the examination that qualifies him as an engineer and on the Santa Fe a fireman in his third year examination takes both a written and an oral examination. The written examination comprises a set I think of 624 questions, it used to be, I am not so positive about that exact number but it is near that, and the transportation rules have about a like number of questions for a written examination. After he completes this, he is given an oral examination from his written examination.

The Court:

Q. Mr. Cooper, counsel asked you about a promotion as an engineer. Are there any promotions after you reach the status of engineer that require further examination?

A. We are called upon quite often, such as air brake cars [fol. 4240] that come over the property and other things like steam heat and air conditioning and things like that, but it is not an examination. It is a form of instruction that we get there, they come along to post us on that stuff.

Mr. Strouss:

Q. Your examination includes an examination as to your knowledge of the operation of the brake also?

A. Yes, sir.

Q. That is also covered by the green book?

A. Yes, sir.

Q. Over the time that you have been operating trains as an engineer have you in addition to your experience there made any study of air brakes?

A. I have. I have always been interested in it since I was a kid when I first started to railroad and I have kept up with it as far as I could, and as I say I have always taken an interest in it and learned what I could about it because I am curious enough to generally want to know something about what I am doing.

Q. In your duties are you required occasionally to make repairs of brakes?

A. Running repairs on the road, such as broken air pipes or something like that.

Q. From your experience and study have you acquired a [fol. 4241] knowledge of the construction and operation of the air brake equipment such that you would be able to describe the air brake equipment on a train?

A. I believe I have a fair knowledge of it.

Q. Will you please describe to the court what the brake equipment is on a train, beginning with the engine?

A. The air brake apparatus on an engine, I would start first with the compressor. That is the air pump for compressing the air for use throughout the train. This compressor stores the air in what is known as the main reservoir. That is for the purpose of storing and cooling the air. This pressure from the pump is exhausted into the main reservoir through quite a length or coil of pipe, that also is for the cooling of the air. We have next different gauges to denote the pressure in the different parts of the system. We have a gauge for the brake pipe, a gauge for the main reservoir, a gauge for the equalizing reservoir, and a gauge for the brake cylinder pressure on the engine alone.

Q. That is, all of those gauges are on the engine?

A. Those gauges are on the engine. Of course, these gauges are all connected by suitable piping. Then we have [fol. 4242] two brake valves, one is the automatic brake valve, that is for conveying the air to and from the train,

operating the brakes on the train. Then we have an independent brake valve which is used for the engine brake only. When operating a light engine alone we use that brake. Then we have a feed valve placed on there as a brake pipe governor that is what it is. It carries a predetermined amount of pressure in your brake pipe. That is connected to your main reservoir by the way of your brake valve. We have a pump governor on there that stops our compressor when we have gained a predetermined amount of pressure in our main reservoir. The Santa Fe uses a duplex governor, what we call the high and low pressure. At the present time on the Santa Fe we use 110 and 130 pounds' pressure in that reservoir. Our feed valve is set for 90 pounds. Then we have the distributing valve on an engine that is used during the automatic operation. The lower portion of this is used when we apply the brakes automatically. The upper portion or the application portion is used when we apply the independent brakes, independent of the train brakes. Then we have the brake cylinders and retaining valve, whistle signal valves.

[fol. 4243] Q. The independent brake that you speak of, that is an independent brake on the engine itself?

A. On the engine itself, yes, sir.

Q. Will you describe that brake to the court?

A. The independent brake is used when we are operating the engine alone or we use it at times to assist in holding a train or at times if the grade is right and the condition is right in stopping a train with it. It is a small valve much smaller than the automatic and it is operated by main reservoir pressure. We have a reducing valve on there that is just exactly the same as the feed valve of the smaller type which reduces the main reservoir pressure down to a point for what the brake cylinder pressure is set for on the engine. On our freight engines that reducing valve is set for 40 pounds. On our passenger engines it is set for 50. This reduced main reservoir pressure flows to this independent brake valve and when the independent valve is placed in application position the air flows to the application cylinder, also into the application chamber. It moves the application piston, this pressure, and when the piston moves it carries with it what is known as the supply valve and opening the main reservoir port from the main reservoir direct to the [fol. 4244] brake cylinder on that engine. This air that reaches the brake cylinder forces the pistons out and forces

the shoes against the wheel. Now it stays in that position until you release it. You place your brake valve in release position and it simply lets this air out through the same pipe from the application cylinder. Then this pressure in the brake cylinder which is backed up against your application pistons, it forces your pistons back to release position carrying with it an exhaust valve which exhausts that brake cylinder pressure to the atmosphere at the distributing valve.

Q. That brake operates independent of the brakes on the cars on the rest of the train?

A. Yes, sir.

[fol. 4245] Q. Now, this brake applies against what wheels of the engine?

A. The driver wheels and the tank wheels.

Q. Is that brake used to any great extent?

A. No, you can't use it to any great extent without overheating your tires, you will slip your tires if you try to use it too much, but of course, in making light movements, why, we use it all the time.

Q. What do you mean by "tires?"

A. The tires are around our driving wheels.

Q. In other words, the driver, driver wheel has tires on it?

A. Has tires on it.

Q. Which are contracted on there by heat?

A. Yes, they are heated, then sweated on there. If you overheat them, they will fall off.

Q. That is the danger in using the independent engine——

A. Using them continuously, yes, sir; you can't use them continuously.

Q. Now, you mentioned the reservoirs on the engine; will you describe those a little more——

[fol. 4246] A. The main reservoirs, you mean?

Q. Yes.

A. Why, the main reservoir on the engines we are operating, we have two of them, they are connected together by a system of piping. I don't know just how many feet of piping that is, but it is inch-and-a-quarter pipe that connects the two reservoirs together, but it is quite a length of pipe, and it is used for cooling the air after it leaves the compressor going into the reservoir. On our engines they are about 18 to 20 inches in diameter, and possibly about eight feet in length, the two of them, and that is the storage for

the air used on the engine and throughout the train and all the auxiliaries throughout the train.

The Court: At what temperature is that air ordinarily kept?

A. Well, I don't know that, your Honor. I don't know just how hot it gets, but I have seen it get awfully hot; if we had a stuck valve, or something, sometimes it will get pretty hot, we have no way of telling just how hot it is only by feeling of it. Sometimes your brake valve will get awfully hot, but that is generally due to a gummed valve like a receiving or discharge valve usually a discharge or intermediate valve of your pump, that is due to backlash and getting [fol. 4247] it hot like that, otherwise, it doesn't get hot at all, it stays fairly cool.

Mr. Strouss: And each one of these reservoirs is about 18 to 20 inches in diameter?

A. Something like that; they might not be that large, might be some difference, but that is a close figure on it.

Q. How does this air which is stored in the main reservoirs get back to the train?

A. That is admitted to the train by the way of the engineer's automatic brake valve through the brake pipe.

Q. What is this automatic brake valve?

A. That is a valve that is placed on the engine for the engineer to operate his brakes with, on the train as well as the engine, you see. It is a valve that has but two movable parts to it, it is a rotary valve which is moved by the handle you operate it with and the equalizing piston. The main reservoir pressure, from the moment you start your pump when it flows into your reservoir, it flows right unrestricted to the top of this rotary valve in your brake valve, then with the brake valve in certain positions, the air passes through the rotary valve down into the brake pipe and flows [fol. 4248] throughout the train. It also at the same time flows in and charges the equalizing reservoir equal with the brake pipe and balances the pressure on both sides of the equalizing piston.

Q. Now, what is the purpose of the valve, the engineer's valve?

A. The purpose of it is to apply and release the brakes and recharge your train, distribute the flow of air, in other words, throughout the train.

Q. And how do you do that?

A. Well, when we couple to a train, we will start the pump, pump our pressures up, and then—excuse me, you mean how do I put the air back in the train?

Q. Yes, how do you get it?

A. After we get a pressure in the main reservoir, we can put the air back in the train pipe in two different manners, in either full release or running position of the brake valve, but generally speaking, full release position has the largest and most direct opening to your brake pipe, so if we want to charge a train in a hurry, we will kick it over in full release position. That opens the largest ports in that brake valve [fol. 4248] direct into the brake pipe. The brake pipe begins right underneath the engineer's brake valve, that is the beginning of it, right underneath the brake valve. Now, the air flows back under the tank and back to the head car through the hose and back throughout the train through the brake pipe.

Q. Now, just explain the rest of the operation of this valve.

A. The brake valve?

Q. In different positions.

A. The valve that we are using at the present time, the E.T. six valve, is a six position valve. Its first position is full release, second is running, the third position is holding, the fourth is lap, the fifth is service, and the sixth is emergency, or the big hole. Now, you want me to operate that brake valve?

Q. Yes, if you will.

A. Well, I would say first that an automatic brake valve is like almost every part of the airbrake system, it works on a basis of equalization, and when you break the equalization you get results. In this valve body we have an equalizing piston, and when I charge the train up I put the same pressure on the top of the piston that I have underneath it, [fol. 4250] exactly the same if I want to operate that brake on the train, I will place my brake valve in service position. In service position you draw the air from what is known as Chamber D, or the equalizing reservoir, it is a cavity just above the top of the equalizing piston. We reduce that through a restricted port opening and exhaust it to the atmosphere at the emergency exhaust on the side of the brake valve. Now, to make myself clear, I will start with a ten-pound reduction. That is even. I will reduce the pressure

ten pounds in this equalizing reservoir in service position; now, the brake pipe pressure underneath that piston is ten pounds greater; that pressure will raise that piston up. When it raises it up it has a stem on this piston and on the end of the stem is a seat that seats in the valve body that controls brake-pipe pressure. Now, when it raises up it will let the same amount of pressure out at this brake-pipe exhaust port as I took out of the Chamber D above it, or it will flow through until it is a little bit less than the weight of the valve and it will drop and seat again. Now, I have taken ten pounds from Chamber D, I have also taken ten pounds from the brake-pipe. Now, that brake-pipe runs back throughout the train regardless of its length, and it [fol. 4251] takes that much pressure away from the triple piston under each car throughout that train, and applies the brakes.

Q. That is in service application?

A. In service application.

Q. How would that brake work if you were going to release the brakes now, I mean the valve.

A. By releasing it? Why, I would place the brake-valve in release position, that will build the pressure up in the brake-pipe, you see, on all the triple pistons throughout the train, and force the triple pistons to release position.

Q. You are building up pressure there. What about your feed valve, that is another valve you have on an engine?

A. The feed valve, that is one of the most sensitive valves, I believe, that we have to contend with. It is nothing but a brake-pipe governor. It is a valve that we use when we are running along over the road and are not using the brakes and have to have something there, a sensitive valve to take care of any leakage through the train as we are running along. This feed valve is the valve that does that. It is connected from the main reservoir by the way of the automatic brake-valve and it is set at a given pressure. On the [fol. 4252] Santa Fe it is 90 pounds, and just as soon as the pressure in that brake-pipe is less than the tension of the spring, regulating spring, on the feed valve, the feed valve will open and supply the leak. As soon as it supplies the leak, it equalizes and closes again.

Q. In other words, it keeps your brake pipe pressure?

A. At a given pressure.

Q. How does the air get back from the engineer's valve back into the train?

A. Through the brake-pipe.

Q. What is that?

A. That is a pipe, an inch and a quarter pipe, that runs, starts at the engineer's brake-valve and runs throughout the entire train. It is connected under each and every car to the triple valve which operates the brake on that individual car. It is connected by a cross-over pipe from the main brake-pipe to the triple valve.

Q. This pipe starts from the locomotive?

A. Starts from the locomotive, yes, sir.

Q. Goes back under the tender?

A. Yes, sir.

Q. Then it goes under each car?

[fol. 4253] A. Under each car.

Q. That is, through the center of the car?

A. Well, I wouldn't necessarily say the exact center, but it goes under the car from one end to the other.

Q. How is it connected from car to car?

A. By air-hose and couplings.

Q. What would be the length of the pipe itself?

A. Under the individual car? Well, let us take a fifty-foot car, it is, I believe, perfectly safe to estimate about 57 or 58 feet of brake-pipe under one 50 foot car.

Q. Does that include the connecting hose?

A. That includes the hose on both ends of the car.

Mr. Mason: Are those the only kind of cars you have on the Santa Fe?

A. No, we have other lengths, but I was estimating on a 50-foot car.

Mr. Strouss: I suppose by mathematics you could figure out what the length would be on a different car.

A. Oh, yes.

Q. It is the length of the car plus the connecting hoses on each end, isn't that correct?

A. Yes, sir.

[fol. 4254] Q. It wouldn't take very much subtraction or addition to figure that out?

A. No.

Q. And you were not intending to say that all cars were built of fifty feet?

A. No, I didn't intend to make such a statement as that.

Q. Then the triple is connected to the main brake-line how? I believe you said by a branch line.

A. By what we call the cross-over pipe, which connects to the main brake-pipe and then connects to the triple valve, and on this cross-over pipe is the cutout cock, where, if it is necessary to cut that brake out for any reason, we use that cutout cock, then bleed the reservoir.

Q. By "cross-over," if I understand you correctly, there is the main brake-pipe line which goes out through under the car?

A. Yes.

Q. Then somewhere along on that brake-pipe line would be a Tee.

A. Yes, sir.

Q. From which will be taken a branch line or cross-over line over to the triple valve?

A. Yes, sir.

[fol. 4255] Q. And on that cross-over line is this——

A. —cutout.

Q. —cutout cock that you were talking about.

A. Yes, sir.

Q. And that is between the triple valve and the main brake-pipe line?

A. Yes, sir.

Q. Then what is the rest of the equipment on a freight car, brake equipment?

A. Brake equipment on a freight car consists of a triple valve and auxiliary reservoir and brake cylinder, the brake-pipe and its connections, the hose and the cutout cock, the angle cock, and a retaining valve.

The Court: Do I understand from that, Mr. Cooper, that there is an auxiliary reservoir under each car?

A. Yes, sir, used as a storage for air under each car to operate the brake on that individual car.

Q. Is that of small storage capacity?

A. Yes, it is about 1,740 cubic inches, I believe, something close to that.

Mr. Strouss: This brake-pipe line, does it have other fittings than this tee that I spoke of?

A. Yes, it has the angle cocks on both ends of it, and, [fol. 4256] some of them have what we call slow bends in them. They don't put any sharp bend in a brake pipe under a car for the reason that it increases the frictional resistance in the pipe when endeavoring to charge these brakes.

Mr. Mason: Your Honor, I haven't objected to the witness volunteering answers such as he has done, but it does occur to me that he has not shown any particular qualifications to show the reason for the construction of an apparatus under a car particularly. I concede his familiarity with the airbrake apparatus on an engine. I ask that the last answer undertaking to describe the reasons for lack of sharp bends in the pipe under freight cars be stricken as volunteered, not responsive, and also because the witness has shown no qualifications.

The Court: Well, it was volunteered. The motion to strike will be denied.

Mr. Strouss: Now, will you just go on and describe the other parts of the equipment, Mr. Cooper?

A. We have a triple valve under the car that derives its name from what it does. It does three things, it applies the brakes, it releases the brakes, and it recharges the auxiliary reservoir. I will give an outline of the valve. It [fol. 4257] has a piston in the valve body in the cylinder, and to this piston is attached a slide valve and a graduating valve, and when the piston moves, these valves move with it. The triple piston operates exactly in the same manner and on the same basis, that of equalization, as I formerly described in an equalizing piston on a brake valve. When you charge a train with the air pressure, the air flows back to the brake-pipe, through the cross-over pipe, and into the triple valve body and against the face of the triple piston, and if that triple piston is not in release position, the pressure will force it over to release position. When that valve is in release position there is a small groove in the bushing, it is about the size of a toothpick and it is cut in the valve bushing. The air in the brake-pipe that charges this auxiliary reservoir goes through that small groove and charges the auxiliary reservoir equal with the brake-pipe. It gives you equalization on both sides of your piston again. The air that you put into that auxiliary reservoir is for the purpose of applying the brake on that individual car. I will make a brake reduction of, say, ten pounds with

the automatic brake-valve on the engine. I will take [fol. 4258] ten pounds of pressure away from that triple piston on the brake-pipe side of it. I take the pressure away from that brake-pipe faster than it can back through this small groove from the auxiliary reservoir, consequently, I again break the equalization on that piston. The auxiliary pressure being greater now than the brake-pipe pressure, forces the piston to its left, carrying with it its slide valve and graduating valve and admits a like amount of pressure from the auxiliary reservoir to the brake cylinder, and that air goes into the brake cylinder and applies the shoes to the wheel, forces the piston out, remains in that position till I get ready to release it or make a further reduction. When I get ready to release it, I place my brake-valve in release position and build up the brake-pipe pressure higher than the auxiliary. That forces the triple to release position. When it goes to release position, I again open this feed groove up here, recharge the auxiliary and the exhaust valve is opened, which exhausts the brake cylinder pressure to the atmosphere at the retainer.

[fol. 4259] Q. You have mentioned the auxiliary reservoir. What is that reservoir?

A. The auxiliary reservoir is provided as a storage for air under each and every car and you use that air to apply the brakes with.

Q. It is under each car?

A. Under each car, yes, sir.

Q. Near the triple?

A. The triple valve is connected to it and the auxiliary reservoir is connected to the brake cylinder. They are all connected together.

Q. How does the air get into that auxiliary reservoir?

A. By way of the feed groove from the brake pipe. With a K-valve we have another feature on there, if you want it, I didn't give you the quick service feature on that or the retarded release, I just gave you the straight plain operation of a triple valve.

Q. You might explain this to the court.

A. In the early days when we were operating the old quick action triple valve the Westinghouse people figured they had a device——

Mr. Mason: I object to that.

The Court: Yes, the objection will be sustained as to that.

[fol. 4260] The Witness: Well, anyway, we have the uniform recharge and retarded release spring placed in the K-2 valve and what it does, and its purpose in placing it in there was to try to overcome slack action.

Mr. Mason: Now, again, your Honor, the witness is explaining and is simply expressing his opinion and conclusion and I think that should be stricken.

Mr. Strouss: He is operating this brake equipment every day and certainly it is part of his business to know what that is put in there for.

The Court: The court will deny the motion. Go ahead.

Mr. Mason: Will you read the last answer?

(The last answer was read by the reporter.)

Mr. Mason: I would like to find out the witness's qualifications on that matter as to the purpose of the manufacturer.

The Court: Do you wish to examine him on that?

Mr. Mason: Yes.

The Court: All right, go ahead.

Mr. Mason:

Q. Mr. Cooper, have you ever been employed by any manufacturer of air brakes?

A. No, sir.

Q. Have you ever had any connection with any manu [fol. 4261] facturer of air brakes?

A. No, sir.

Q. Have you ever been consulted by any manufacturer of air brakes in connection with designing or redesigning of air brakes?

A. No, sir.

Q. Would your answers be the same if I were to ask you if you were connected with or consulted by a manufacturer of triple valves?

A. Yes, sir.

Q. Have you ever of your own motion submitted to a manufacturer of air brakes or triple valves any design such

as you have described for the elimination of certain features or the production of certain features of its action?

A. No, sir.

Q. Have you ever been in any official position with the Santa Fe having to do with the construction, operation or purchase of air brakes by the Santa Fe for its cars?

A. No, sir.

Q. Or with any other railroad?

A. No, sir.

Q. I take it then that your only knowledge of the purpose for which these were placed in the triple valve was gathered from what somebody told you?

[fol. 4262] A. No, I wouldn't say that. I gathered the knowledge I have individually from handling it.

Q. As an engineer do you have to apply the brakes on individual cars through the use of the brake apparatus on the individual cars or don't you always apply it from your valve on the engine?

A. Apply it from the engine when I am handling it, yes.

Q. Then your only purpose for which a change may have been made in the construction of the triple valve, how did you gain that if not from having someone tell you?

A. I gained it from handling a train.

Q. You gained the only result from handling the train but how did you know why the manufacturer changed the design of the triple valve if he did change it?

A. I guess you are right on that, what the design was, but I know what it did and it accomplished their purpose to a great extent.

Q. If you don't know what their purpose was except from hearsay, how can you say that?

Mr. Strouss: I don't think the witness said the manufacturer's purpose was to design anything.

Mr. Mason: No, I had it read carefully and he said the purpose of placing this particular apparatus which he de[fol. 4263] scribed was to eliminate or do something about slack action. How does he know what the purpose was? He confessed that he knew it only because somebody told him.

Mr. Strouss: He said nothing about the purpose of any manufacturer.

The Court: It is quite evident to the Court that this witness has had a lot of experience in the actual operation of these various types of valves and it is equally clear from

the manufacturing or production standpoint he has had no experience, so if the witness will confine himself to his experience in the operation of these valves without going into the purpose that the manufacturer may have had in mind you may proceed.

Mr. Strouss: I submit, your Honor, he has never stated the purpose of the manufacturer was anything.

The Court: Go ahead, Mr. Strouss, and confine it within those limits.

The Witness: Can I put it this way——

Mr. Booth: You haven't been asked any question.

Mr. Strouss: He was trying to give an answer.

Mr. Mason: He is trying to give a lecture now. You will obviate a good deal of nervousness on our part if you will [fol. 4264] ask the questions, Mr. Strouss.

The Court: We have listened to quite a few lectures during the case, so go ahead.

Mr. Strouss: If you will proceed.

A. I was trying to give a description of the additional features added to a K valve and what they accomplish over and above what we had in the quick action standard valve. The quick action standard triple valve had nothing but an emergency feature to it. That is the service and emergency feature over and above a plain triple. When the K-2 valve was introduced they added what was known as the quick service feature. That feature will or was provided for that purpose and will——

Mr. Mason: Now——

The Court: Yes, I will sustain the objection to that as to what it was provided for. Tell what it does in actual operation?

A. It applies the brakes on a long train easier with a smaller reduction than the old standard, that is, quick service. It does that by venting a portion of the brake pipe air in each car to the brake cylinder instead of exhausting it all the way out the engineer's brake valve. The uniform recharge and retarded release, they have a spring in there that when the valve is in that position, uniform recharge and [fol. 4265] retarded release position, the spring is compressed, it restricts the flow of air from the brake cylinder to the atmosphere and from the brake pipe to the auxiliary. You accomplish that on the head end of the train and that

is to get the air to the rear of the train and release the rear brakes and hold the head end applied and created a smoother handling of the train and it certainly does it.

Mr. Mason: I wonder, Mr. Strouss, if you will ask the witness to give us the dates of this change?

A. The K-2, I would have to guess at that but it is back in probably 1913 or something like that.

Mr. Mason: Just after 1912 was it?

A. Somewhere in there the K-2 came out. I don't know, I am guessing at that.

Mr. Strouss:

Q. Before that the air was all vented out the engineer's valve?

A. Yes, sir, you had to draw it all out at the engineer's brake valve. This new improvement utilized a portion of that waste of air in the brake cylinder under each car and was quite a saving and it would apply the brakes quicker throughout a long train more uniformly.

Q. You mentioned the brake cylinder as part of the equip- [fol. 4266] ment of a car. What is that?

A. The brake cylinder is where you build up your pressure to exert the force against the wheels, the shoes against the wheels. It is a piston in a cylinder and the piston is connected with suitable rods and levers that when the air is placed in this cylinder it forces the piston out and forces the shoes against the wheel.

Q. Is there any additional parts of this brake equipment which you haven't already described? Have you described the retainer?

A. We have a retaining valve which is placed on the exhaust pipe from the triple. A retaining valve, we have several different kinds. We have the two-position retainer and the three and some are merely a weighted valve and others are operated by spring pressure. It is a very simple device that is attached to the exhaust pipe from a triple valve and placed on a boxcar near the running board on the top of the car and when the brake cylinder pressure with the handle in operative position, turned up, when the brake cylinder pressure exceeds the weight of that valve in the retainer the pressure will raise the valve off of its seat and blow away

at the exhaust port but just as soon as the pressure in the cylinder is reduced below the weight of that valve it will [fol. 4267] drop and close the exhaust.

Q. That is a fixed pressure, a predetermined pressure?

A. Yes, it depends on the weight of the valve. The one most commonly in use is the 15-pound weight and then we have the double three-position retainer that had a 10 and 20 pound but that was spring pressure in those, but the same thing.

Q. When that retainer is operating, it retains a certain amount of pressure in the brake cylinder?

A. Yes, sir.

The Court: That would be uniform on all the cars in the train?

A. Where the retainer was in service, yes, sir.

The Court: We will take our mid-afternoon recess at this time.

(Thereupon a short recess was taken after which proceedings were resumed as follows.)

The Court: You may proceed.

Mr. Strouss:

Q. Mr. Cooper, you have explained the different parts of the brake equipment. Now will you explain how the brakes operate on a train? You might begin when you first couple into a train with your locomotive.

A. My first duty is to charge the train. We do that by [fol. 4268] permitting the main reservoir pressure to flow back by way of the brake valve into the brake pipe and charge the auxiliaries on each of the cars equally with that of the brake pipe.

Q. What pressure do you carry?

A. On the Santa Fe we carry 90-pound brake pipe pressure, 110 and 130 main reservoir pressure.

Q. When your train is charged, your brake pipe line will have a 90-pound pressure and your auxiliary reservoirs will have 90-pound pressure on the Santa Fe?

A. Yes, sir, we make a brake pipe reduction with the automatic brake valve. We reduce the brake pipe pressure on the face of each and every triple piston throughout the train. The auxiliary pressure being greater moves the triple

piston and deposits ten pounds' auxiliary pressure into the brake cylinder. Ten pounds of pressure from the auxiliary placed in the brake cylinder will give you 25 pounds' brake cylinder pressure, two and a half times more than your reduction. That is their ratio. It remains in that position until you are ready to release the brake. You release the brake by building up the brake pipe pressure greater than the auxiliary, forcing the triple pistons back to release position, opening the feed groove and recharging your aux- [fol. 4269] iliary and opening the exhaust port from the triple valve to the atmosphere and exhausting the brake cylinder pressure.

Q. Are there different types of brake applications?

A. Yes, we have both service and emergency.

Q. What is the difference?

A. In service position you make a gradual reduction in the brake pipe pressure and your triple pistons respond slowly, gradually, and apply the brake, but in emergency you exhaust the pressure suddenly from the triple and the brake pipe, it gives a sudden reduction, it makes a quick movement of the triple pistons and the triple pistons will move with velocity enough that it will strike the graduating post and spring and compress it. That movement permits your triple piston to travel slightly further in its bushing than it does in service position and opens what is known as the tail port or emergency port and this auxiliary pressure on top of your emergency pressure, that forces that piston in a downward position. As it goes down, it has a stem under it, it unseats what is known as a rubber seat valve or the emergency valve. It knocks that valve off of its feet. [fol. 4270] Brake pipe pressure when the valve was first charged is ever present in what is known as cavity Y or that pressure underneath the brake pipe check valve in the valve body. The brake pipe pressure quickly raises that check valve and flows directly to the brake cylinder along with the auxiliary pressure. By getting that quick action you accumulate about ten or twelve pounds' more pressure in the brake cylinder in emergency than you do in full service. Full service is merely an equalization of the pressures in the auxiliary, the brake pipe and the brake cylinder. To figure that say on a 70-pound brake pipe pressure it is easier to figure 20-pound reduction in the brake pipe on a 70-pound brake pipe pressure would give you full equalization in the

three, 20 pounds from the brake pipe leaves 50. Twenty pounds from the auxiliary leaves 50, and 20 pounds of auxiliary pressure placed into the brake cylinder, two and a half times 20 is 50, 50, 50 and 50 and any further reduction than that is simply a waste of air and creates pump labor.

Q. When you have charged your brakes and on the Santa Fe say your main reservoirs carry 110 and 130 pound pressure, they will have that pressure and your brake pipe line will have 90 pound pressure?

[fol. 4271] A. Yes, sir.

Q. And your auxiliary reservoir under each car will have 90 pound pressure?

A. Yes, sir.

Q. Your brakes are in release at that time, aren't they?

A. Yes, sir.

Q. When you apply the brake what is the operation?

A. I reduce the pressure in the brake pipe.

Q. Where do you do that?

A. I do it with the engineer's brake valve in the cab of the engine.

Q. You move that to service position?

A. I place it in service position and make that reduction. I do it as I explained formerly in the operation of the automatic brake valve by raising the equalizing piston, exhausting the same amount of pressure from the brake pipe at the brake pipe exhaust that I formerly took from the equalizing reservoir on top of the piston.

Q. In other words, when you place the engineer's valve in service position that causes——

A. (Interrupting) That causes automatic operation of the equalizing piston.

[fol. 4272] Q. And permits the exhausting of a certain amount of air from the brake pipe?

A. The same amount that I took out in the service exhaust port from the equalizing reservoir itself.

Q. Then what is the operation with that reduction of the brake pipe pressure, what happens in the cars?

A. That reduces the pressure on each triple piston and causes the triple valve to operate and apply the brake under each car. The brake pipe is one continuous pipe throughout the entire train and any reduction that I make on it I get that reponse throughout the train.

Q. Go ahead and tell how that applies to brakes.

A. It reduces the air on the brake pipe side of the triple piston, it breaks the equalization, in other words, on that triple piston, and as soon as the equalization is broken on it, it is perfectly free in its bushing, the greater pressure will move the piston toward the weaker pressure. There is a slide valve connected to this piston that when the piston moves it will eventually pick up the slide valve and pull the slide valve with it. The piston will move until it comes to rest against the graduating post and in [fol. 4273] that position the slide valve will register with a port under the seat of the valve which will permit the auxiliary air around the slide valve to flow through that opening into the brake cylinder. That pressure will continue to flow through this opening and into the brake cylinder until the pressure in the auxiliary is a little less or enough to overcome the frictional resistance of the valve. Then the brake pipe pressure which is still here will force the brake valve back to what we call lap position. When it goes back to lap position the slide valve does not move due to a quarter inch of slack or lost motion but it does move the little graduating valve which is inside the slide valve. The graduating valve does nothing but controls this service port that permits the auxiliary air to flow to the brake cylinder. It shoves it back far enough to close that port and the instant that does that the reduction stops and the equalization is effected on the pistons and it stands there until a further reduction is made or until a release is made.

Q. In applying a brake you release or exhaust air from the brake pipe?

A. In applying the brakes I take the air out of the brake pipe. In releasing a brake I put the air in the brake [fol. 4274] pipe.

Q. This exhaust is up in the locomotive, is it, from the brake pipe?

A. That is in the engineer's brake valve underneath the engineer's brake valve in the valve body. The equalizing piston controls that port. When it is off its seat the brake pipe air can blow away to the atmosphere; when it is on its seat it blocks it from blowing away to the atmosphere.

Q. Where does the application begin to take effect?

A. Generally at the point where the reduction is started if the equipment is O. K. If you start the reduction on the head end of a train you generally get your action on the head brakes first. If you start it on the rear of the train, you would have it on the rear of the train first.

The Court: How would you start it on the rear of the train?

A. The conductor has a valve in the caboose or you could use it with an angle cock on the rear of the train, open an angle cock. Any reduction in the brake pipe regardless of where it is will apply the automatic brake on a train.

Q. There is a valve in the caboose?

[fol. 4275] A. Known as the conductor's valve, yes, sir.

Q. Is that used very often?

A. It is used by the trainmen quite a bit when the occasion arises. It is mostly used for an emergency case where they have to stop. The proper manner of stopping a train is generally getting a signal to the head end and let the enginemen stop it but in case they couldn't get a signal or something like that the conductor will use the valve on the caboose but it is mostly in emergency cases that it is used.

Q. Are there any peculiar problems or difficulties in the operation of brakes and the handling of trains that you have to guard against?

A. I don't get your question.

The Court: Read the question.

(The question was read by the reporter.)

A. Yes, we are up against a proposition, the greatest of it is in train handling, operating a train with an automatic air brake is to get control of the slack.

Mr. Strouss: What do you mean by "slack"?

A. Slack is that lost motion that exists in each and every one of the freight cars around the drawbars.

Q. In the Southern Pacific Company air brake rules [fol. 4276] and regulations, exhibit No. 319 in evidence, appears this statement, "Smooth train handling depends on the effort to control slack and how to prevent it from

running in and out harshly." In your experience in operating trains have you found that statement to be true?

A. Very much so, yes, sir.

Q. (Reading "Where so controlled no draft gear in fair to good condition will be damaged. Slack action cannot be prevented but by acquiring knowledge of the various causes for it and exercising forethought in the use of steam, train brakes, independent engine brake and sand, it can be controlled, even to the extent of avoiding further injury to damaged draft gear." In your experience in operating trains have you found that to be true?

A. To a great extent, yes, but there are some times where an engineman cannot control it. We get trains made up, loads and empty——

Mr. Booth: Your Honor, I think the witness has answered the question and is now proceeding to something else.

The Court: Yes, I am inclined to agree with you.

Mr. Strouss: He says that sometimes that is true but [fol. 4277] others not.

Mr. Mason: Let the record speak for itself rather than have counsel tell us what the witness said.

Mr. Strouss: I think I have a right to address the Court without counsel telling me what to do and what not to do.

The Court: Certainly, Mr. Strouss. If the witness has not finished his aitswer, he may proceed. I was of the impression that he had and to save argument and referring to the record proceed with the next question.

Mr. Strouss:

Q. You say there are times when that is not true?

A. Yes, sir.

Q. What do you mean by that?

A. There is a difference in trains. I have found in my experience a number of different kinds where it is absolutely impossible to control the slack in a train and you would try every conceivable means at your command but you would still handle them rough. Other times you would be handling a train or the train would be handling rough with you and you would learn about it from the trainmen. You could change your method of manipulation and possibly [fol. 4278] overcome it, but other times, no.

The Court: So you would learn about it from the trainmen, you mean the engineer himself up ahead couldn't tell?

A. Yes, sir, we can half kill them on the rear end at times and we will never know anything about it until they come over and tell you.

[fol. 4279] Mr. Strouss: Now, the further statement appears, "the heavier the engine and the longer the train, the greater is the care required." Have you found that to be true in your experience, Mr. Cooper?

A. Yes, sir, the longer the train the more slack.

Mr. Booth: We move to strike out the last sentence. The witness answered the question and said "Yes."

Mr. Strouss: Will you explain what your experience has been in that respect.

A. My experience in that is that for every car picked up in a train adds just that much slack to it, it adds the amount of slack that that individual car contains, and the longer the train the more cars you have, the more slack you have in that train to control, and consequently, it is harder to control because there is more of it.

Q. Still reading from Exhibit 319, "When slack runs in or out one part of the train gradually attains a lower speed than the other, and the shock is the result of draft gears having suddenly to make the speed uniform on the instant slack is all in or out. How heavy the shock will be depends mainly on the difference in speed that must [fol. 4280] instantly be made uniform and on the weight that must suddenly be altered in speed." Have you found that to be true in your experience?

A. Yes, sir, that is a description of slack action. Slack action is created in that manner, by one part of the train trying to stop, the other part trying to go, or the reverse, it creates a slack and starts it to running.

Q. Now, reading again from Exhibit 319 at page 9: "With high pressures and large main reservoirs it is very easy to overcharge the head end of the train; many detrimental effects result, such as stuck brakes, flat and broken wheels." What has been your experience in that respect, Mr. Cooper?

A. It is just that. You overcharge the head end of a train invariably in trying to release your brake on the

rear end, that is where you have a heavy train down a mountain grade and in trying to recharge your train you invariably get more or less of an overcharge on your head end. Now, an engineer usually works or tries to avoid that by using, after he comes back from his release to running position, a kick-off to get rid of the brakes on the head end, because the overcharge on the head end will immediately reapply the brakes on the head end, consequently they don't get any cooling period, and it is a dangerous [fol. 4281] procedure to follow it by not getting rid of it, and you will find you will burn the wheels up if you have very far to go.

Q. Now, does the fact that the gauge on the engine shows a high pressure, necessarily mean that the pressure is up on your brake-pipe line back in the train?

A. No, that is entirely a false pressure; your gauge will show you this overcharge on the head end while the rear end isn't charged at all.

Q. Reading from Exhibit 319: "Many are of the impression that because the brake-pipe gauge shows higher than the auxiliary reservoir pressure is intended to be, that all brakes are released. As a matter of fact, this is a condition that exists only on the first few cars in the train, the pressure at the rear not having sufficiently increased to release the brakes. In fact, twenty-five cars back from the engine it cannot be determined whether the brake-valve handle is in release or running position. With a large capacity feed valve, the brake-valve handle should be held in release position not to exceed twenty-five seconds when releasing brakes only is the object. The excep- [fol. 4282] tions to this rule are when charging the brake system and braking on grades under all conditions." Have you found that to be true, Mr. Cooper? What has been your experience in respect to it?

A. Well, I couldn't say as to that twenty-five or thirty cars back, because I don't know that, but I do know that what is expressed there is absolutely correct about the false pressure on the head end.

Q. And the failure of brakes to release?

A. Yes.

Q. Have you had that experience?

A. Oh, yes.

Q. Now, the green book which is in evidence as Exhibit 152, at page 28, states: "Tests have demonstrated that following a full service application with a type C car train, it often takes from six to ten seconds for the release wave of air to pass from the engineer's valve to the rear car." What has been your experience in that respect?

A. That is what I judge to be a pretty correct figure. That is a 50-car train?

Q. A 50-car train.

A. That is a pretty good figure.

Q. In other words; when they release——

[fol. 4283] A. For the release wave to reach there.

Q. From the engine to the rear car?

A. That doesn't mean that you would release that brake in that time.

Q. What do you mean by that?

A. I mean, that after the release wave reached the 50th car, it has to build up sufficient pressure back there to force the triple piston to release position and start the recharge. The recharge takes place after the piston has been forced to release position.

Q. So that after the air wave has passed from the engine to the rear car——

A. It will take just a little time after to force the valve to release position, till the pressure builds up high enough on it to force it over.

Q. It then begins to recharge?

A. Yes, at that point.

Q. Now, if the train were a hundred cars, would that still take longer?

A. Oh, yes; oh, yes, quite a bit longer.

Q. Now, how would that affect your ability to control slack in a train?

A. Your ability to control slack in a train rests solely on your ability to apply and release the brakes throughout [fol. 4284] the train. If you are operating a train where you are unable to keep it fully charged down the grade and you fail to operate your brakes on the rear or fail to release them, you are liable to run into a serious slack action.

Q. Now, on page 11 of Exhibit 319, appears this statement: "An automatic brake application will cause the brake-pipe pressure to reduce faster at the head end of the train than at rear. This results in the head brakes applying

in advance of those at the rear, and tends to bunch the train and compress the draft gears." Have you found that to be true, Mr. Cooper?

A. Yes, sir, the head brakes would apply first.

Q. In other words, with an application of brakes, that is, there is an exhausting of the air at the engineer's valve in the engine, I believe that is what you testified to?

A. Yes, it will start the brakes to applying on the head end first.

Q. That exhausting of the air reduces the pressure in the brake-pipe line?

A. The quick service feature of the triple valve assists a whole lot in that, in making that reduction throughout [fol. 4285] the train more uniform but it is not completely uniform yet. The head brakes will apply in advance of the rear brakes.

Q. Well, reading further: "In releasing, the head brakes commence so much before those at the rear that as far as holding power is concerned, they are practically off before the rear ones start to release, causing the slack to run out rapidly."

A. Yes, sir.

Q. That you have found to be true?

A. Yes, sir.

Q. "Just how serious the results may be largely depends on how heavily they are applied, the amount the draft gears are compressed, and how slowly the train is moving." Has that been true, in your experience?

A. Yes, sir.

Q. Now, what is the character of the territory in which you have been working, Mr. Cooper?

A. Well, it is very little of it level, there is some of it a rolling country, hogback country, but most of it is what you would call, I presume, a mountainous territory, one-and-one-half-per cent grade.

The Court: Did I understand you to say that you were operating between Seligman and Barstow?

[fol. 4286] A. At the present time, I hold seniority there between Seligman and Bakersfield, that is the Arizona division, but I am operating an engine at the present time, holding a run between Needles and Barstow, that is, I am operating a cut-out pool, rather, between those points, into Barstow some time.

Mr. Strouss: Mr. Cooper, I give you Defendant's 118 in evidence. I wonder if you could take that and sort of indicate to the Court how the air operates on a train?

A. Well, how many cars does that consist of, anyway?

Q. It is testified there were 160 on there.

Mr. Mason: I think the record shows that this was a regular 160-car train on the Chesapeake and Ohio. The exhibit shows 160 cars.

The Witness: Now, your question, Mr. Strouss?

Mr. Strouss: Using that exhibit, explain to the Court how you apply the brakes on a train, and this statement No. 319 that in applying brakes the head end will begin to apply ahead of those in the rear.

A. Well, I was just trying to see with a train that length of how much air it would take with our present equipment [fol. 4287] to apply the brake throughout that train.

Q. Do you know how many cubic inches of air it would take to fill a brake-pipe on one car, about a 40-foot car?

A. A forty-foot car, I believe is around 3100 cubic inches. Well, to tell the truth, I wouldn't want to start out with that up there.

Mr. Booth: I am going to suggest, your Honor, that the witness is hardly qualified to discuss operation of a 160-car train. He says the longest train he ever operated is 112 cars.

Mr. Strouss: Well, I imagine the air goes back through,——

The Court: ——proportionately. The objection is overruled. Go ahead.

A. Well, to control that train on a mountain grade, that being a train of coal and 160 loads——

Mr. Strouss: I don't believe you understood my question. I wanted you to explain to the Court how the brakes are operated. I mean, you have said there is an application of the brake that you used the engineer's brake valve in the——

A. Service position.

Q. And that causes——

A. The automatic operation of each and every one of those triple valves in that entire train.

[fol. 4288] Q. Your engineer's brake valve is up here on the engine?

A. On the engine, and the last triple is on that caboose in the rear.

Q. And when you apply the brake, you put the brake valve in——

A. Service position.

Q. Service position, and that causes——

A. The automatic operation of each and every triple valve throughout the train.

Q. How does it do that?

A. By reducing the brake-pipe pressure up on the head-end of the train, on back under each individual car as you go back to the rear end. With a train of that length, your service reduction would have to be—Well, I don't know just how on a 160-car train, but it would take, I would judge you wouldn't apply that brake under ten pounds.

Mr. Booth: Your Honor, the witness is guessing at it. We object to that, "I judge so and so," he is not producing the result of any experiments or personal knowledge.

The Court: Yes, I will sustain the objection as to that.

Mr. Strouss: What operates this brake on this last car [fol. 4289] back here?

A. The engineer's brake valve on the engine.

Q. Up on the engine?

A. Yes, sir.

Q. It is operated by the passing of a wave of air back through the air, or the taking out of air?

A. Yes, sir, the same thing. They are all operated in the same manner on all triples.

Q. Are there any peculiar methods used in braking trains in mountain territory, Mr. Cooper?

A. Well, we use different methods, we adopt them among the men mostly; our green book advocates about the same rule as the Southern Pacific in train handling, but we have adopted different methods from that in that book in order to assist us in handling the train.

Q. Well, among railroad men, are there different methods that have a common name?

A. Yes; we use what is called the "bridge" and the "overcharge" methods.

Q. And the short hold and the long hold?

A. Yes, the short cycle method of braking, the short cycle method is the approved method, but the men get away

from that at times on long trains, excessively long trains where they have trouble in maintaining their brake-pipe [fol. 4290] pressure in holding the train.

Q. What is the short cycle method of braking?

A. That is a method which I use myself exclusively, and it is what we call a slightly heavier reduction with a shorter hold, you get the brakes under them, and you feel them, you have them grabbed, why you kick them off, recharge, and do the same thing over, just a series of it, but it is among some of the men in train handling, it isn't the desirable way with them, because it creates the racing of a train more or less and a variation in the speed. Good train handling consists in maintaining a uniform speed, and where you are maintaining uniform speed you avoid to a great extent wheel heat and slack action to a great extent also, but there are certain dangers that go with the long hold, the bridge, and the overcharge methods.

Q. What is the long hold? Let us describe each of those methods.

A. The long hold is just the reverse from the short. You get the air under them and you hold it there as long as you can and ride the train. It is the bridge, the long hold is the bridge method, and the long hold is included in the overcharge method.

[fol. 4291] Q. What is the overcharge?

A. The overcharge method of braking a train, before you tip the summit, you put an overcharge in your brake pipe. An overcharge in a brake pipe is the pressure above the adjustment of the feed valve, or the train line governor, you put a false pressure back in the brake-pipe higher than the feed valve is set for, then when you descend the hill, start to descend, you have got that additional pressure to start with over and above your feed valve pressure, and by the leakage in the train, sometimes if you can catch it just right will start the application for you, but if it don't, why, just a slight reduction with your brake valve will give you the result, and then you ride it; and the dangers that exist in that and the reason that I have been away from it myself is, that you lose control of the brakes back on the rear of the train in that case, those that you apply, because if you want to release that brake, the pressure is so high in the brake-pipe and the frictional resistance so great that it is almost impossible to get a release

wave back on a long train to kick that brake off. The consequences are, it rides until it naturally leaks down itself to a point where you can kick it off.

[fol. 4292] Q. Are there any dangers?

A. Oh, yes. That is a bad one, lots of dangers exist there in busting of wheels, sliding of wheels, overheating, it takes the control away from the engineman. He should have control of that brake at all times, and he loses it with that method.

Q. Are there any dangers in connection with the long hold?

A. With the bridge method, I don't like the bridge method for the same reason. It has its dangers, the bridge method is simply a matter of getting air enough under a train to steady it at a given speed and then find the point on the valve body just where you can put the air into the brake-pipe as fast as it is leaking away. If there is no leakage in your train, you can't do a job of bridging. Possibly, the best leakage to do a job of bridging is four pounds to the minute, then you have a good train to bridge. You place your brake-valve handle between lap and running position just far enough that you open the port from the feed valve to the brake-pipe that will let the feed valve put the air in as fast as it is leaking away, and you are maintaining that pressure down the hill, and the trouble is, the fellows [fol. 4293] who use that, they hold it too long, and the longer they hold it the greater are the dangers. Now, for instance, a rubber seat valve on a triple valve leaking to such an extent that you can't hear it blow at the triple exhaust on an individual car back there with that long hold, why, that will put brake-pipe pressure into that brake cylinder, and so if you had a 90-pound brake-pipe to start with and you hold your train with about eight or ten pounds, you still have eighty pounds pressure in your brake-pipe, and in this long hold, that little leak in there that you can hardly hear will put that 80 pounds in that individual car, that is enough brake pressure to bust a wheel; if it doesn't bust it, it is going to slide it right now.

The Court: The court will be at recess until ten o'clock tomorrow morning.

(Thereupon, the court stood at recess until April 10, 1941, at ten o'clock A. M.)

[fol. 4294] 10 A. M., April 10, 1941.

All parties being present as heretofore noted, proceedings were resumed as follows:

The Court: You may proceed.

TRACE H. COOPER resumed the witness stand.

Mr. Strouss: Mr. Cooper, yesterday you testified concerning the duties of a locomotive engineer. I have plaintiff's exhibit No. 320, rules and regulations of the transportation department of the Southern Pacific Company, rule 874, "enginemen must be alert in all matters pertaining to safety and while running must keep a constant and vigilant lookout, carefully note all signals, observe position of switches affecting their movement and watch for obstructions and defects in track. They must frequently look back for signals and indication of defect in train especially while rounding curves and approaching sidings." Are those similar to the duties which you have as a locomotive engineer on the Santa Fe?

A. Yes, sir, that is practically a standard rule.

Q. Yesterday you testified concerning the engineer's valve and stated that that valve had six positions and I be-[fol. 4295] lieve you described two of those positions, the release position and the service position. Will you now describe the other four positions of the engineer's valve?

A. The remaining four positions would be running position, holding position, lap, and emergency. Running position is the position in which the brake valve is carried while running along when the brakes are inoperative or not being operated rather. The feed valve is in control of the brake pipe while the brake valve handle is in that position and any leak that might occur in the train pipe throughout the train or any other leak of this kind is controlled by that valve. The main reservoir pressure flows to this feed valve and is there reduced to the brake pipe pressure, in fact it enters the valve at main reservoir pressure which in that position is 110 pounds and leaves the valve to the brake pipe at the reduced pressure of 90 pounds. That pressure is reduced by the means of a regulating spring and a supply valve which allows the pressure to flow through the valve and when the pressure flowing through the valve reaches a predetermined pressure or the adjustment regu-

lating spring, the spring reacts and closes the flow of air [fol. 4296] to the brake pipe. Any reduction throughout the train is taken care of in that manner by the feed valve. That is running position.

Holding position is exactly the same as running position only it is provided on the brake valve to hold the engine brakes applied during an automatic operation of the brake while releasing the train brakes. The only distinction between running and holding position on an automatic brake valve is that in running position the distributing valve release port is open and in holding position this port will be closed. The closing of that port in holding position holds the engine's brakes applied in holding position.

Q. Now lap position?

A. In lap position all ports in the valve are closed, that is the position we carry our brake valve in after we have made an application of the brakes. We return our valve to lap, that means all ports are closed except in one instance, some instances it is connected up, that is the high pressure pump governor is connected by way of the automatic brake valve. Lots of times that is connected direct to the main reservoir and does not come by way of the brake valve, but if it comes by way of the brake valve the port leading from [fol. 4297] the main reservoir to the high pressure pump governor will be open on lap.

Q. Now emergency position?

A. Emergency position is the position we use in an emergency case when we desire quick action throughout the train. By placing the valve handle in emergency position we open the largest ports in the brake valve direct to the atmosphere and exhaust all of our equalizing reservoir pressure and our brake pipe pressure direct to the atmosphere at the automatic brake valve through the emergency exhaust port. In an emergency position the equalizing piston does not move, it remains on its seat but we exhaust the pressure in another way and through a larger opening. When I place the brake valve in emergency position I immediately exhaust that pressure from the brake pipe equalizing reservoir on the engine and that exhausts the pressure in the brake pipe accordingly throughout the train. We have on the tank of the engine what is known as a vent valve, it is provided to insure emergency. If the emergency was failing to run rapidly enough to throw the

first triple into emergency, this vent valve is there to assist it, it just creates a larger opening to the atmosphere from the brake pipe, that is its purpose. That emergency action [fol. 4298] runs throughout the train——

Mr. Mason (Interrupting): Just a moment, the question was addressed to the position of the engineer's brake valve and nothing was said as to the action of the train. The rest of the statement is volunteered.

——Mr. Strouss:

Q. Will you please go ahead, Mr. Cooper?

Mr. Mason: I would like to have the question asked.

Mr. Strouss: I am asking him to explain the action of emergency on the train.

The Court: Objection overruled, go ahead.

A. When this reduction is made at the engineer's brake valve as I said before, it immediately exhausts all of the pressure from the valve body from the equalizing reservoir and the brake pipe. This creates the emergency reduction or the sudden reduction on the triple pistons throughout the train. It starts with the first one first and on back through the entire train through every triple piston. The reduction is so sudden by that heavy reduction in brake pipe pressure that the triple pistons will assume the emergency position. In that position they move their extreme length in the valve body and open a port known as [fol. 4299] the emergency port that allows the auxiliary pressure to flow to the top of the emergency piston, also to the brake cylinder, forcing the emergency piston down which unseats the emergency valve or the rubber seated valve, and that allows what pressure remains in the brake pipe to rush into the brake cylinder along with the auxiliary pressure. Those two pressures equalizing in the brake cylinder in emergency give you a slightly higher brake cylinder pressure in emergency than it does in full service.

[fol. 4300] Mr. Strouss: Now, Mr. Cooper, does the length of the train have any effect upon the braking of the train?

A. Yes, sir; the longer the train the longer it takes the brakes to apply.

Q. Will you just explain how that is in an application of the brakes first?

A. Well, in applying the brake, we start our reduction at the head end of the train, and that reduction necessarily has to pass back through the entire train to every car in the train. It starts with the head car first, and then goes to the second car and on back, and the more cars you have in the train, the longer it takes to apply them, quite naturally, because the reduction has to go throughout the entire train. If I wanted to apply the brake on a 70-car train, I would have to make that reduction on that triple valve 70 cars away from the engine. If I want to apply it on a hundred car train it is just the same, no difference.

Mr. Mason: Your Honor, I haven't offered any objection to this testimony on the ground that it is not proper rebuttal, but so far I am mystified as to what, if anything, it may be in rebuttal of, what the purpose of the testimony is. [fol. 4301] Do I understand that it is the State's contention that the brakes on our trains are inadequate to control trains of more than 70 cars; is that the State's contention?

Mr. Strouss: If the Court please, I am surprised quite a little if I understand the defense to say that they have presented no evidence here that this law has any purpose in the aid of safety. Then I move the Court for judgment for the plaintiff, because certainly if there has been no showing here that there is a purpose in this law to protect property and life, if there hasn't been any evidence on the part of the defense, and I am in accord with Mr. Mason, I don't think there has been, then certainly we are entitled to judgment against the defendant, because there cannot be any showing of any unconstitutionality without showing that this law was not enacted in the aid of safety.

Mr. Mason: Now, do I understand then that this testimony purports to be in rebuttal of our safety showing?

Mr. Strouss: It is for the purpose of showing, I think it is quite evident to the Court if not to counsel, that this evidence is for the purpose of showing that this law has as [fol. 4302] one of its purposes safety.

Mr. Mason: Safety in what respect? Limitation of trains to the length that can be controlled by the type of airbrake? This is airbrake testimony, and presumably it is addressed to the point that trains must be limited to 70

cars in order to control them. Will you say yes or no, Mr. Strouss?

Mr. Strouss: I don't think I have to go into detailed explanation at this time of my testimony. The law has for one of its purposes, the safety of persons and property.

Mr. Mason: Now, your Honor, the law purports to limit freight trains to 70 cars and, as Mr. Strouss says, that is for the purpose of safety of persons and property. I take it, that it is a maintenance of employment first. If the law's ostensible purpose is to limit trains to 70 cars and no more, it must be because trains of greater length are unsafe to operate. Now, this is all airbrake testimony; this testimony must be for the purpose of showing that with the types of airbrakes used on Santa Fe trains, trains of longer than 70 cars cannot be controlled and stopped. Is that its purpose? Why are we dealing with the subject of airbrakes [fol. 4303] except for the purpose of showing that they do or do not control trains?

Mr. Strouss: I don't think I am required to sit here and answer counsel's questions.

Mr. Mason: I want to know what this is in rebuttal of. All this testimony of airbrakes is plucked out of thin air so far as our case is concerned. If it is rebuttal, what is it rebuttal of? If it is to show that the law is unconstitutional, if so, in what respect and for what reason. We were not ourselves backward in stating the purpose of our testimony whenever it was questioned. Is there any mystery about this, Mr. Strouss?

Mr. Strouss: Now, if the Court please, our rules require, if I remember them correctly, possibly counsel haven't read the rules of the courts in this state, that they address themselves to the Court and not to counsel. I don't think I am required to sit here and answer questions of counsel.

Mr. Mason: Your Honor, I move that all this testimony be stricken, and further questions along the same lines, that an objection be sustained on the ground it is not proper rebuttal.

The Court: The motion to strike will be denied. Pro- [fol. 4304] ceed.

Mr. Strouss: Now, Mr. Cooper, will you just explain in the same way, the effect an increase in the length of the train has upon your releasing the brakes in the train?

A. We experience more or less trouble in releasing

brakes on trains as the length varies. After I have applied the brake on the train, and I do that by taking the pressure from the brake pipe, now, I have got to return that pressure back into the brake pipe. My source of supply is the engine.

Q. What do you mean, you have to return that back into the brake pipe?

A. To recharge it for another brake application, or to release the brake. My source of air supply is the main reservoirs on the engine, and when I am ready to release the brake, I place my brake valve in release position, which starts a release wave from the main reservoir through the train to each and every one of these triple pistons. Now, our trouble in that, the longer the brake pipe the more air we have to use, and on a brake pipe reduction where the pressure is reduced in it, when we attempt to release we are up against that resistance in that brake pipe in addi- [fol. 4305] tion to what other resistance there is in the pipe to build the pressure up to force the triple piston to release position, so that I can again effect a recharge. As an illustration of forcing the pressure back against the pressure in the pipe, may I just say as an example that you have a flat tire on your automobile. When you go to pump it up by hand, when you first start to pump that tire up, there isn't much resistance, but as that pressure increases in there, you work harder to get it in there. That is what we are up against in forcing a release wave back through these long trains to get the brakes released, and we don't start our recharge to replenish our pressure there until the pressure has forced the triple piston to release position, and then we have to put the pressure back into our auxiliaries through a tiny opening not any larger than the small end of a toothpick. Now, you figure one hundred cars, say they were 50-foot cars, or 40-foot cars, 40-foot cars would be 4000 feet, 50-foot cars would be 5000 feet, that 100th car is 5000 feet from its source of supply, and I have to force that pressure back from this engine to that triple valve to kick that brake off and recharge it, and in mountain grade braking we don't have the time, before we [fol. 4306] can get that pressure back to the rear end after making a brake application our train is gaining in momentum to such an extent that we have to go after them again, and after about the second application that way, we don't

operate the brakes on the rear end of trains of that length, we are just helpless.

Q. That is in mountain operation?

A. Yes, where you are working the brakes continuously down the grade.

Q. As you make an application, then release and grab them again after they have picked up momentum?

A. Yes, sir.

Q. And that there isn't time between the release and the application to build up the brakes again?

A. Yes, sir.

Q. Now, you spoke about leakage a while ago. Has that any effect upon your brakes?

A. Brake pipe leakage is considered one of the detriments to the airbrake system; it applies the brakes harder than the engineer desires, it creates pump labor, it is instrumental in damage to equipment, wheels, and everything else.

Q. Is there any fixed leakage which you are permitted to have in your train, or limitation upon the amount of leak- [fol. 4307] age which you are permitted to have in your train before you can leave a terminal?

A. On the Santa Fe we are allowed five pounds per minute permissible. If there is more than five pounds' leakage in a train, we are permitted to make a stand on it, but they still reserve the right that we will leave with the train with more than that leakage on an order from the superintendent.

Q. Now, is there any difference in braking of loads and empties?

A. Yes, sir.

Q. What is that?

A. When you load a car you decrease the brake efficiency on that car to the extent of the load. In other words, an empty car is much easier to stop than a loaded car on account of the weight. We put the same brake cylinder pressure into a loaded car as we will into an empty car, and it might not have any effect on it at all on holding it, where that same amount would stop the empty. It is the loading of the car that decreases the brake efficiency. We use the same cylinder pressure at all times, but it decreases in efficiency as you load the car.

[fol. 4308] Q. What about in mountain operations, the picking up of speed?

A. A load will gain its momentum a great deal faster than an empty, and we use more air to hold it, requires more brake cylinder pressure to hold it, consequently it requires more air.

Q. Now, in exhibit 152, the Santa Fe green book, appears this statement: "The difference in grade over which the train may be passing when the brakes are applied—for example, one portion of the train may be on an ascending grade, when the grade would assist the brake in stopping the cars; and another portion of the train may be on a descending grade, in which case the grade would oppose the effort of the brake to stop the cars. Such a condition requires care and judgment on the part of the engine man as regards the time and manner of operating the brake to prevent as far as possible severe shocks and strains due to the action of the slack in the train." In your experience, have you found that to be true, Mr. Cooper?

A. Very much so. That covers, Mr. Strouss, the handling or controlling of slack on what we call hogback country, where one part of your train is ascending and the other [fol. 4309] part is descending. It is a critical condition for an engine man to have to use his brakes while the train is in that position, but sometimes it arises where it is necessary, he gets a flag or something, and he has to stop, and there is no way on earth of making a quick stop under such characteristics as that that you can avoid terrific slack action in a long train.

Q. Now, at page 17 of Exhibit 152, there appears this statement: "Shocks are caused by the difference in holding power and speed throughout the train, and to consequent running of the slack. The longer the train the greater may these differences become." Have you found that to be true in your experience, Mr. Cooper?

A. Positively so.

Q. Now, yesterday you testified concerning the use of the conductor's valve. Are there any peculiar dangers in respect to that valve?

A. There is in this respect, that when the conductor's valve, that is the valve on the caboose, when that valve is used it is because, generally speaking, that they fail to get a signal to the head end due to the position of the train or something, and the conductor is attempting to stop the

train for some reason or other, and the engine man doesn't [fol. 4310] know anything about it, and that is where the dangers lie. Now, if this engineman should receive the stop signal after the conductor has started that reduction on the rear end, and of course, when he gets his signal he is going to try to stop too, and you are making the reduction from both ends then, or trying to, and that is nothing less than a calamity. We have lots of break-in-two's from the use of that valve and lots of rough handling because of that misunderstanding. It is not necessary at any time to use the conductor's valve, if they can get the signal to the head end any time, except in time of emergency, of course, the train in the ditch or something, the conductor widens on the valve and stops it. We have a new valve, we call it new, which has got an improvement over the old valve that we formerly had, and it has about five positions on it. That valve can be opened in its first position without doing any damage to the train, in my opinion, if you will permit me to express it, but it won't hardly stop the train. The opening in that first and second position in that valve is so arranged that the opening is just a little bit larger than the opening in the feed valve on the engine, [fol. 4311] which is putting air into the brake pipe at that time as the conductor is taking it out, consequently, that makes a very gradual reduction on a train, and you will run a long ways and the trouble is the trainmen, when they are using that, they lose their patience and they get it too wide. Now, if the engineman——

Mr. Mason: Just a moment. I think that has gone about far enough in the matter of hearsay. The witness obviously is not in position to tell what the trainmen do in the caboose because he is in the engine. Is this based upon your own personal observation?

A. No, I never saw the conductor apply the air on me.

The Court: Well, I will sustain the objection as to the action taken by the conductor, of which this witness has no knowledge. I would like to ask this question, Mr. Cooper: I understood you to say that as an engineer there were six different positions that you could place this in in stopping your train or using these airbrakes. Now, is the conductor limited to one?

A. May I explain that to your Honor? I stated there are six positions of the engineer's automatic brake valve. There

is only two of those positions in which I am taking the air [fol. 4312] out of the brake pipe to apply the brakes. The other three positions I am putting air into the brake pipe to keep the brakes released and recharged.

[fol. 4313] The Court: How many positions does the conductor have?

A. The conductor has just a simple valve, and what I mean by the six positions, maybe I am wrong in that, there might be only five, I have looked at the valves but not so carefully, but the first position opens the opening to the brake pipe so much. The second position gives her just a little bit more opening and when he gets it all the way down he has it all the way open, wide open. He does that not to make it all at once and throw the train into emergency.

Mr. Strouss:

Q. The different positions simply determine the amount of reduction that is made?

A. He has no way of determining the amount of reduction. He has a gauge and can see the reduction it goes down to but what I mean, it is not an automatic operation with him back there like it is with your brake valve. It is just a straight cut-out cock and he opens it up a little bit at a time by these different positions. It is a different arrangement, it is not a brake valve at all. It is a valve provided for emergency only and they are not required to use it unless they think it is an emergency.

Q. Yesterday in describing the brake equipment you [fol. 4314] mentioned the retainers. Those are only used in mountain operation, isn't that true?

A. Yes, sir, mountain operation.

Q. They are located where on the car?

A. On a boxcar they are located up near the running board, that is the top of the car, anywhere from a foot, some of them are a little bit further down probably from the top of the car. On a tank car they are generally on the side and on a flatcar or gondola they are on the end of the car.

Q. When those are in use, what is done with the retainer?

A. When you want to use the retainer?

Q. Yes.

A. The retainer is used to maintain a certain portion of the brake cylinder pressure during the release of the brakes. The single retainer, as we call it, is generally a weighted valve and we have the three-position retainer which is

operated with a spring also, ten and twenty pounds. This single weighted valve would retain fifteen pounds brake cylinder pressure in the brake cylinder while the brake was being released in this way. The retainer is connected onto the exhaust pipe from the triple and all the brake cylinder pressure must go out this pipe and by this retaining valve. [fol. 4315] As long as the pressure in the brake cylinder exceeds the weight of that valve, which is fifteen pounds, it will hold it up off its seat and the air will blow out to the atmosphere but just as soon as the weight exceeds the pressure the weight will drop to its seat and stop the flow of air and retain it in the brake cylinder.

Q. When the retainer is in use there, how is it put in use? Is there a handle or something to turn it?

A. There is a handle on the retainer. When the trainmen who operate the retainers are required to use them, they go over the top of the car and they turn these handles up into operative position. When the handle is down, it is cut out completely, it doesn't operate and they do that on each and every car on which they wish to operate the retainer.

Q. Would that be all of the cars in the train?

A. All of the cars are equipped with retainers.

Q. They wouldn't use all of the retainers?

A. No, no, not as a rule where the retainers are in use. They alternate them, turn them up here, one here and one there and alternate them so that in case of wheel heat developing from their use they will go over and alternate [fol. 4316] them, cut this one out and cut that one in.

Q. Are there any dangers in connection with the use of retainers?

A. Yes, sir, they are hazardous for the trainmen to operate in the first place and they create undue wheel heat.

Q. That is because the brake is kept applied?

A. Applied all the time, they never let the brake release, very seldom. If the retainer is holding to any length of time at all, it will never let that brake release, consequently you will never get any relief until you stop the train and cool the wheels.

Mr. Mason: Your Honor, I should like to have some explanation of the pertinency of this testimony. I don't like to object and keep interrupting but I don't see what pertinency rebuttal testimony respecting retainers has insofar

as the defendant's lines are concerned. I am informed from what I consider good authority that retainers are not in use at all on defendant's lines in Arizona or New Mexico between Yuma and El Paso. I don't know how much they are in use on the Santa Fe but I am informed also on what I consider good authority that they are not in use between Barstow and Seligman where this witness operates.

[fol. 4317] Mr. Strouss: We have in evidence, if the Court please, the Southern Pacific timetables. If they are not in use, they have a rule that provides for the use of them, on page 10 of Tucson division timetable, exhibit No. 175 under the heading "Air Brake Rules, Rule 43, Retainers will be used on grades of 1.4 per cent to 1.5 per cent on freight trains of less than 110 M's per operative brake when necessary in the judgment of conductor and engineer; on freight trains averaging 110 M's and over on grades of 1.4 per cent to 1.5 per cent, and on all freight trains on grades of 1.5 per cent and over retainers will be used as follows: 1.4 per cent to 1.5 per cent, inclusive, one retaining valve for every 150 M's; over 1.5 per cent to 1.8 per cent, inclusive, one retaining valve for every 140 M's. Over 1.8 per cent and so forth."

Mr. Mason: Now, if your Honor please, this exhibit to which Mr. Strouss now refers was introduced at his request. It is true it was introduced through Mr. Baker, one of our witnesses, but at his request and he is in effect rebutting his own testimony or explaining it, if that be the proper word. In the second place, there are no grades between El Paso [fol. 4318] and the Arizona line in excess of 1.4 per cent as his own testimony shows, as the profiles that he has introduced in evidence show. So he is undertaking to rebut that which he has himself introduced. They are simply exploring something, however it may be of academic interest, it is not proper rebuttal and is irrelevant and immaterial.

The Court: The objection is overruled. Proceed.

Mr. Strouss: Will you read the last question.

The Court: We will take our mid-morning recess at this time.

(Thereupon a short recess was taken, after which proceedings were resumed as follows)

The Court: You may proceed.

Mr. Strouss:

Q. Mr. Cooper, just before recess you testified that one of the dangers in the use of retainers is that it will hold the brakes on too long and heat the wheels?

A. Yes, sir.

Q. Is one of the duties of the engine crew as well as the train crew to observe the train during operation, to notice any indications of wheel heating?

A. Yes, sir, we have to watch that very carefully, especially where retainers are being used.

[fol. 4319] Q. When some indication of wheel heating is noticed, what is done?

A. The usual thing is for the trainmen to go over the train and turn it down to release the pressure. That creates a very dangerous thing for the brakeman.

Mr. Mason: I object to the remainder of the answer as voluntary.

The Court: Yes, it may be stricken.

Mr. Strouss:

Q. In the application of brakes—a question I intended to ask before—is that a straight application of air from the engineer's valve to the brake?

A. Not on our trains. It is an automatic brake on our trains. We have straight air on some of our switch engines and things like that and if you will permit me to explain the difference in that between an automatic brake and a straight air brake. A straight air brake is operated by taking the pressure at the reservoir and putting that pressure direct into the brake cylinder and forcing the piston up and applying the shoe to the wheel and when you release it, it is the same way, there is no automatic operation in the straight air brake. We have the straight air on a lot of automobiles and busses and things like that but on a freight train we [fol. 4320] have the automatic brakes. When we apply the brake on a freight train, it is necessary that we break the equalization. It is based on equalization. We put the same amount of pressure on a triple piston, the valve that operates the brake on that car, we put the same amount of pressure on both sides of it. We have brake pipe pressure on one side and when the brake is fully charged we have auxiliary pressure on the other side, the piston is floated. In order

to apply that brake on each of those cars throughout the train, it is necessary that a reduction in brake pipe pressure be made to break that equalization. In other words, we break it by decreasing with the automatic brake the brake pipe pressure on the brake pipe side of the triple piston. Now, that breaks the equalization. I reduce this pressure here below this pressure here. The piston is just floated in the cylinder. Now as soon as that pressure is reduced over there, this greater pressure will force the piston to move to the weaker pressure and when it moves it carries with it the slide and graduating valve which are attached to the piston stem and it moves over there and registers the port which allows the pressure on this side now to flow to [fol. 4321] the brake cylinder until it is a little bit less or equalization again effected so that the brake pipe pressure will force it back to its lap position. That is the automatic operation. That is the distinction between an automatic brake and the straight air brake.

The Court: But you only use the straight air brake on switching?

A. There are very few switching engines any more that use it. Some of them of the older type still use a straight air valve but they are not in use on trains.

Mr. Strouss:

Q. Do you know what type of triple valve or air brake is used on the cars that are operated over the division that you work in?

A. Yes, sir.

Q. What types are they?

A. The triple valves?

Q. Yes.

A. We have the K-2 valve and some AB valves.

Q. Your AB's, are those of a type that you can tell them by their appearance?

A. By their appearance, yes, sir.

Q. Do you have very many of those in trains that you have operated?

A. We have some, yes. All of our later equipment in the [fol. 4322] boxcars and refrigerator cars are equipped with the AB but none of our old equipment has the AB on it.

Q. About what percentage of the equipment that you have worked on would you say is equipped with the AB?

Mr. Mason: I object to that on the ground the witness is not qualified unless some foundation is laid.

The Court: The objection is sustained.

Mr. Strouss:

Q. Have you observed the cars in trains on which you have been the engineer?

A. Yes, sir, I have observed any number of them.

Q. And observed them with respect to the triple valves that were part of the equipment on those cars?

A. Yes, I have taken an interest in that. I am interested in knowing how many of them we would have in a train and lots of times I ask the carmen as they go over the train as to how many AB's we have got. I don't think I have ever had a train out any time that consisted of——

Mr. Mason: (Interrupting) Just a moment. I ask that that answer be stricken after the reference to the inquiry [fol. 4323] of the carmen and I would like to inquire a little myself.

The Court: Yes, the answer may be stricken and you may take him on voir dire.

Mr. Mason:

Q. How many trains in actual number have you actually checked personally and without reference to inquiry from the carmen as to the number of AB's?

A. Mr. Mason, the engineer has generally got other duties to perform besides going back on a train to look at those individual trains.

Mr. Mason: I ask that the answer be stricken as not responsive and the witness be instructed to answer the question. Will you please read the question, Mr. Reporter? May I have the answer stricken?

The Court: Yes, it may be stricken.

Mr. Mason: Will you read the question?

(The question was read by the reporter.)

A. Do you mean trains I am going to handle or trains I have seen going by?

Mr. Mason: Trains that you were handling.

A. I have not checked any of them.

Q. Have you gone down to the yards or stood on the sidings elsewhere and checked trains going by to see how many AB's there were and counted them?

A. Yes, I have.

[fol. 4324] Q. How many?

A. Probably one or two that I have been interested in and looked at them.

Q. I understand you have never checked any train that you were handling and only one or two others?

A. Not the AB, no; go back and look at them.

Mr. Mason: That is all.

Mr. Strouss:

Q. Since the AB valve has been in use on the Santa Fe, have you noticed any difference in your ability to control slack action in the train?

A. No, I have not noticed any difference whatever. We don't have enough of them to make that I don't believe.

Mr. Mason: Your Honor, I will ask that the last portion of the answer be stricken.

The Court: The last portion of the answer may be stricken.

Mr. Mason: He does know how many we have.

Mr. Strouss:

Q. Have any difficulties with respect to train handling developed since the AB brake has been in use?

A. Yes, sir, if you will permit me to explain why I say "Yes."

Q. If you will explain.

[fol. 4325] A. Prior to the introduction of the AB brake we had practically eliminated undesired emergency to a great extent. We had it at times but the introduction of the heavy spring into the K had it practically eliminated or we felt so anyway. When the AB brake was introduced about the latter part of 1933 and the early part of 1934, we again were up against undesired emergency in most every train we would get that was equipped with an AB brake. In fact, we know that the AB was causing the trouble because we would cut them out and get away from it. We could never get them to kick standing but as soon as we got them to running it was just one kick after the other. The trainman would go along and cut out the AB brake and eliminate it.

The Santa Fe at that time had instructions out that we must stop with our undesired emergency and make the required test and report it by wire to the next terminal. Now we have got so much of that that they have canceled those instructions and we no longer make any report on them whatsoever. When they kick with us, we take it on the chin, do the best we can and go on.

Q. Does the engineer have any duties in connection with observing the train, Mr. Cooper, that is, while the train is running?

[fol. 4326] A. Yes, sir, that is part of our duties. The rules require that we keep a lookout for any defect within our vision that we can see. We are supposed to watch the train the same as the trainmen are.

Q. What part of the train are you expected to observe?

A. That is the head portion of it where the engine is attached. I can only observe a portion of it. My duties require me to keep a lookout most of the time the way I am going but on curves and things like that we take our observation, especially where we are braking a train down a hill, we watch to see how the train is braking; at night-time to see how the fire is flying and look for any defect that might occur, a hot wheel or anything that might cause us trouble.

Q. Brake rigging down?

A. Yes, that is one of the things, wheels sliding, brakes stuck, brakes failing to release.

Q. What effect, if any, does the length of the train have on the performance of that duty?

A. The trains get so long at times that we cannot inspect them, we cannot see, we are limited to vision.

Q. Referring to defendant's exhibit No. 118, the engi-
[fol. 4327] neer's duty with respect to observing that train would require him to observe back——

A. (Interrupting) Yes, his duties would require him to observe any defect that occurs in that train, but his eyesight is not good enough, he can't see that far, he couldn't observe it.

Q. Is it ever necessary for the engineer to communicate with the crew on the rear of the train?

A. That might be as to his orders or something like that, yes, it would be necessary in that manner.

Q. Or for the crew on the rear of the train to communicate with the engineer?

A. Yes, if they want to issue some instructions to the enginemen or conductor, it is necessary for him to come over there to do it. The Lord knows he can't talk from that caboose to that engine.

Q. Does it occur occasionally while a train is moving that it is necessary for communication between the crew on the rear of the train and the engine crew on the engine?

A. Oh, yes, that develops. The conductor might pick up some instructions or something on the rear of that train as they go by an office and he might want to communicate it to the head end someway or other and he has no means of doing it.

[fol. 4328] Q. How do they ordinarily communicate?

A. Why, that is by signals, hand signals.

Q. And how are those given?

A. Why, if he wants me to stop, he gives me a stop signal.

Q. And at night?

A. A fusee is a signal at night, they will crack a fusee and when we see it from the head end, we immediately stop, because we know that is what he wants.

Q. And now, where is the signal given from?

A. He will start the signal from the caboose here.

Q. In other words, in order to communicate between the train crew on this train and the engine crew, it is necessary for the enginemen on that end to see the signal given by the trainmen back here in the caboose?

A. Absolutely, unless the conductor had started a trainman over the train while it is running there to give the signal.

Q. You would either have to see the signal back here or ask trainmen on top of the train to pass the signal?

A. Yes. It is impossible, the limit of vision, to see the length of the train while you are running along on account [fol. 4329] of the dust and weather conditions, you couldn't see a signal on that caboose in the daytime. At nighttime now, we get our signals transmitted easier than in the daytime, because I can see the red flare. In the daytime it is an impossibility. That is ridiculous, a train of that length.

Mr. Mason: I don't know but that the last remark should be stricken as volunteered. The witness doesn't claim any knowledge of conditions on the Chesapeake and Ohio. This

train was testified to by the assistant to the president of that road, as being typical of trains operated on the Chesapeake and Ohio.

Mr. Strouss: Is your ability to start and stop a train affected any by the length of the train, Mr. Cooper?

Mr. Mason: I object to the question, and again I suggest that unless it be the contention of the State that there is some issue in this case as to the ability of the brakes to function properly to control and stop trains of more than 70 cars, the question and the answer are immaterial and irrelevant, as well as not being proper rebuttal.

The Court: The objection is overruled.

[fol. 4330] A. Yes, sir.

Mr. Strouss: Will you explain that?

A. The longer the train, quite naturally the heavier it gets, and requires more pressure to charge the train. It is a lot easier for an engineman to handle a train of reasonable length than it is to handle one of an unreasonable length, due, as I explained here, the matter of handling that train successfully and controlling the slack in it on these grades, for every car added to that train we add just so much slack. With the older equipment, that slack will run from ten to twelve inches per car; on the newer equipment it has been reduced some, they have added heavier equipment, and cut the slack down to probably, I would say, seven or eight inches per car, but with 70 cars and on an average of eight inches of slack, we will say, to the car, with 70 cars that would be 560 inches of slack in that train that I have got to control, and in the operating of the brakes, we have to take that into consideration, it is a prime factor, the slack. Now, we will apply the brake on the train, on the long train, in fact, it is easier to apply the brake on a long train while it is fully charged than it is to release that brake after you apply [fol. 4331] it, for this reason, in applying a brake, taking a hundred-car train and applying the brake on it with the quick service features of our K valves, I can probably apply that brake on that 100 cars with everything fully charged up with about a seven or eight-pound reduction in the brake pipe. I will apply it, I am starting with a 90-pound brake pipe, and make, say, a seven-pound reduction on it, and I get the brake applied on the rear end of that 100-car train; now, it is up to me to release that brake from the engine,

and I have got to build the pressure up through that enormous brake pipe, 100 cars there probably, if it is 50-foot cars, I have five thousand feet to force that air back through that train pipe and kick that brake off back there, and I am forcing it back against all that resistance in the brake pipe. After I have forced it back there and got the triple to release position, if I have time to do it, then the recharge starts, then I have to wait until the air can equalize back there to re-apply that brake. That is the trouble we experience on our grades, our inability to keep the rear end of those long trains charged up while descending these grades, and it results in the failure to operate the rear end of the [fol. 4332] train, the brakes are absolutely worthless. While the law gives us 100 per cent air, we haven't got it because we cannot get it there.

Q. Now, does the length of the train have any effect upon the distance within which you can stop that train? That is, will that distance increase or decrease?

A. Yes, sir, it will take you longer to stop those long trains than it does a shorter train because you have the slack to take care of in that, you have to control it. Of course, if a train is longer, naturally it is going to be heavier.

Q. Do you have any grade crossings in your territory, highway grade crossings?

A. Yes, we have a reasonable amount of them.

Q. Are there any problems, engineer's problems in connection with operating through territory where there are a great many grade crossings?

A. Yes; he has to be alert at places like that, at these crossings, and we are up against it all the time. Many narrow escapes at them, and lots of times they don't escape, these automobiles, trucks, and things, and we have to be on our guard at crossings. We don't have so many of them in the desert country where I am operating at the present [fol. 4333] time, we have only possibly two or three that amount to anything there, but other parts of the country we have plenty of them.

Q. Now, a train approaching a crossing, where it would appear that it might strike an automobile, what will the engineer do to avoid it, what can he do to avoid striking that automobile?

A. Well, he has the emergency feature on his train and he is permitted to use it in case of a life or loss of property like

that, but I have seen such results from the use of that where the trainmen were off their guard, that I have always promised myself faithfully that I am going to give that fellow on the caboose as much consideration as I am this fanatic driving this car, because I have seen that happen, big-holing a train unexpectedly to trainmen, I have seen it put them in the hospital.

Q. If you attempt to stop a train under those conditions, would it be necessary to use the emergency application of the brake?

A. To avoid the accident, possibly so.

Q. And have you any opportunity to bunch slack?

A. You have no time to prepare for your stop. An engineman that uses any common sense in train handling, Mr. [fol. 4334] Strouss, if he knows he is going to make a stop, with these long trains especially, or with short trains, as far as that goes, he starts back at a good reasonable distance to make his stop. He does that in order to get control of his slack, but where these sudden stops are forced upon you where you have to make them now, you have no chance for preparation to make the stop, and you just take it on the chin, and the trainmen do likewise.

Q. In your experience in operating engines, is there any length of train which you as an engineer feel that you can safely handle and control the slack?

A. Well, that is a hard question to answer. I have seen slack action in short trains, but of course, I have seen it worse in the longer trains, but I have always liked, just a personal like, about handling a train of anything around 60 to 65 cars makes a nice train, anything below that up to 60 or 65 cars, makes what we consider a nice train.

Q. And as your length of train would increase over that, do your problems in safely controlling that slack increase?

A. Yes, sir.

[fol. 4335] Mr. Mason: Your Honor, I will ask that the answer be stricken. That is one of those leading questions——

The Court: Yes.

Mr. Mason: When counsel wants to argue the case with his witness, I think that is going too far; I think the question and answer should be stricken.

The Court: The question and answer may be stricken.

Mr. Strouss: As the length of the train increases, what, if any, effect does it have upon your ability to safely control the slack in the train?

A. You increase the length of the train and you increase the slack in the train, because every car added adds just that much more to it, and quite naturally, if you have a long train you have more slack than you have in a shorter train, and it is more difficult to control because there is more of it.

Mr. Strouss: Take the witness.

Mr. Mason: If your Honor please, there are some features of this testimony, as to which I should like to take more time. I would rather defer cross-examination of Mr. Cooper if I may to a later convenient time. I assume Mr. [fol. 4336] Strouss will have no objection to deferring cross-examination.

Mr. Strouss: Oh, no. Of course, I don't like to keep Mr. Cooper here any longer than possible. I would like to complete his examination so that he can leave this week.

Mr. Mason: Yes, I can do that.

Mr. Strouss: I am willing that they have the time. I like the same courtesy shown to me that I showed to them, that the witness be examined so that he can get away as early as possible.

The Court: Certainly.

Mr. Mason: I will release him as soon as possible.

The Court: You may step aside, Mr. Cooper.

[fol. 4337] E. J. Durnil was called as a witness in rebuttal and, being first duly sworn, testified as follows:

Direct examination.

By Mr. Strouss:

Q. Will you state your name, please?

A. E. J. Durnil.

Q. Where do you live, Mr. Durnil?

A. Tucson.

Q. What is your business?

A. I am a conductor with the Southern Pacific Company.

Q. What experience have you had in railroading, Mr. Durnil?

A. Approximately 30 years.

Q. Will you just state that experience to the Court?

A. Well, I was a brakeman, starting out as a brakeman, was promoted to conductor March 26, 1917. I worked alternately from 1917 as a brakeman and conductor up to about 1935, when I then became a regularly assigned conductor. At the present time I am holding an assignment as conductor between Tucson and Lordsburg, New Mexico.

Q. Is that in freight or passenger service?

[fol. 4338] A. Freight service.

Q. Now, has all of your railroad experience been with the Southern Pacific Company?

A. No, no, I was first employed as a brakeman by the Atcheson, Topeka & Santa Fe at Clovis, New Mexico, from 1910 to September, 1912. Following that I was employed by the Union Pacific at Denver for a short period, then the Oregon Short Line at Pocatello, Idaho, and came to the Southern Pacific Company in December, 1912.

Q. Over what territory have you worked?

A. I worked over the entire territory from Yuma, Arizona, to El Paso, Texas.

Q. What territory are you working on now?

A. Between Tucson and Lordsburg, freight service, also, I do extra passenger work.

Q. You do, then, some passenger work?

A. Yes, sir.

Q. Does the Southern Pacific Company have rules relative to the duties of conductors and brakemen?

A. Yes, sir.

Q. And are you required to pass examinations covering those rules?

A. Yes, sir.

Q. Will you in your own way, Mr. Durnil, explain to [fol. 4339] the Court, the duties of a brakeman, beginning when he first is called for duty.

A. The first duty of a brakeman, he must have a standard watch, must have that watch inspected twice each month, semi-monthly. Reporting for duty in some terminals, he signs a register showing the time he goes on duty; he then reports to his train, performs the duties of preparing his caboose; if he is the flagman, the placing of markers, lighting his lights, marker lights, and his red lights, inspects his train to let off hand brakes; some trainman, swing, brakeman, he performs the same, except he makes a check of the train, taking numbers, initials, and

classifications of the cars, gives that check to the conductor; the head brakeman, he lets off brakes preparatory to the train departing from the terminal. After they leave the terminal——

Q. Does the head brakeman go to the roundhouse to accompany the engine when it cuts into the train?

A. At Lordsburg and at Gila they do, but at Tucson, Yuma and Phoenix, they do not. The yard men place the road engines on the trains, and after the engine is placed on the train, the brakemen are supposed to know [fol. 4340] that the engine is on, then they release the hand brakes if there are any handbrakes set.

Q. Now, are there further duties before their run begins?

A. That just about constitutes their initial duties at the terminal.

Q. Is that true of all terminals, or are there some places where the trainmen are required to assist in testing the air?

A. At Lordsburg, New Mexico, and Gila, Arizona, the trainmen get their engines from the roundhouse, perform whatever necessary switching may be done, and when the engine is attached to the head end of the train, they make a terminal air inspection of the train. After the pressure is brought up to 80 pounds on the caboose, the engineer makes a reduction of the air, the brakemen make a personal inspection of each car in the train to ascertain if the air is properly working in every car. If they find it is, they give a release signal and the engineer releases the air. Should they find any cars in the train with the air cut out, they are supposed to notify the conductor and those cars are supposed to be switched immediately ahead of the caboose and brought to the next terminal where the car inspectors make the necessary repairs on the car. If the [fol. 4341] train is O. K. to go, then the trainmen permit it to roll by out of the terminal to see that all the brakes are properly released.

Q. What do you mean by "permitting it to roll by?"

A. The engineer takes the train out about eight miles per hour, and the trainman stands still and watches the car roll by, particularly noting that the air is released on all these cars.

Q. Now, will you continue with the duties of a brakeman while the train is in operation?

A. After the train is in operation, the first duties of the trainmen is to familiarize himself with the train orders, particularly note the conductor's train register of overdue, superior trains, also, confer with his timetable of any immediately due superior trains, and see that the orders are fulfilled. If he notices any overdue superior trains, it is his duty to call it to the attention of the conductor and the engineer. That is the limit of responsibility of the brakeman, so far as orders is concerned. He then watches and observes the train on both sides while in motion, notices the position of train order boards. When the train is stopped, it is necessary that they pick up and set out [fol. 4342] cars; in setting out cars it is necessary to secure the car by hand brake, also in picking up into the train they are supposed to see that the hand brake is released, and take particular attention that the air is properly working in the car picked up.

The Court: Can those hand brakes on any individual car be released other than from the top of the car?

A. No, sir; they also load or unload any merchandise that may be required to load; they brass cars when necessary, cut the air out of cars when necessary, and make proper report to the conductor, or if they note any defects in tracks, bridges, or any other irregularities, they are supposed to report them to the conductor or the engineer that proper reports may be made to the superintendent; supposed to cut road crossings, pay particular attention to traffic over those crossings when other trains are approaching to avoid any accidents, and are under the general supervision of the conductor as to any other duties that may be required of them.

Mr. Strouss: Have they duties with respect to passing signals?

A. They are supposed to pass signals from the rear to [fol. 4343] the head end of the train, and to the engineer.

Q. Have they any duties with respect to flagging of trains?

A. Yes, when a train stops, under circumstances in which it may be overtaken, the flagman must proceed back immediately with the proper flagging equipment, which consists of, daytime, red fusees, red flag, and torpedoes; at night time, the red lantern, white lantern, fusees, and torpedoes.

The Court: How far back is the rear brakeman supposed to go?

A. He is supposed to proceed back at least one quarter of a mile and place one torpedo, proceed on back at least one-half mile and place two torpedoes, return to his one torpedo, if recalled, he is supposed to take up his one torpedo, and by night leave a red fusee burning. That is prescribed, known as Rule 99 of the Rules and Regulations of the Southern Pacific Company.

[fol. 4344] Mr. Mason: The volume to which the witness has referred is in evidence as I recall as exhibit No. 320.

Mr. Strouss: That is correct.

Mr. Mason: I have no objection to the witness undertaking to give the substance of the portion of rule 99 but the rule being in evidence speaks for itself. He said a quarter of a mile and the rule says a sufficient distance to insure protection and that means more than a quarter of a mile or half a mile as the circumstances require.

Mr. Strouss:

Q. Suppose retainers were being used, would the trainmen have any duty?

A. Yes, it is the duty of the trainmen where it is required to turn up his retainers and ride out with them, releasing those that the wheels may become too hot and it is his duty to release that retainer, and on working retainers on empty cars he places a retainer on every other car and alternates with the others down the grade.

Q. When trains are using sidings, has he any duties then with respect to switching?

A. Yes, the trainmen must line the main line switches and derails in proper position for the train movement; likewise when they leave the siding they must line those [fol. 4345] switches and derails back in proper position.

Q. The duties you have been relating, are those duties that apply to freight or passenger service?

A. Well, generally those are freight brakemen's duties with the exception of rule 99 which also are the duties of passenger trainmen.

Q. There are different types of freight service, by that I mean through, local, mixed?

A. Yes, that is correct.

Q. Are there different duties with respect to local freight operations than apply or are in addition to those in through service?

A. Yes, local freight service is supposed to do the station switching at stations where it is necessary, load and unload freight, fill water cars as required.

Q. What about through trains?

A. Through trains are trains generally with all through freight in them, go from one terminal to the other without any switching service except on some occasions the chief dispatcher will have you pick up some cars at certain places.

Q. Are there any duties peculiar to mixed train operations?

A. A mixed train operation is where you handle both [fol. 4346] local freight and passengers which require one brakeman to take care of the passengers and also assist in switching and loading and unloading freight and picking up and setting out cars and setting hand brakes, cutting crossings, and other work as directed by the conductor.

Q. Are there any additional duties on the part of the brakeman which apply in passenger service?

A. Passenger trainmen are also supposed to observe their train while running, inspect it when standing still by placing their hands on the journal boxes, also noting brake beams or any other defect that they may be able to find. They are also supposed to be courteous to the passengers, provide seats for them, assist them with their baggage, see that they are detrained at their proper stations, work retainers when necessary and also other duties that may be required by the conductor.

Mr. Strouss: I am about to pursue a different subject, your Honor.

The Court: Very well, the Court will be at recess until 2 P. M.

(Thereupon the Court stood at recess until 2 P. M. this day.)

[fol. 4347] 2 P. M., April 10, 1941.

All parties being present as heretofore noted, proceedings were resumed as follows:

The Court: You may proceed.

E. J. Durkil resumed the witness stand.

Mr. Strouss:

Q. Mr. Durnil, before lunch you were discussing the duties of a brakeman. Had you completed the description of those duties?

A. There is one more I would like to add, a very important duty of the brakeman and that is to consult the bulletin boards before going out on each trip, which is a very important duty of the brakeman to note any changes that may have been made by the superintendent.

Q What are the duties of a conductor?

A. The duties of a conductor are practically every rule in the book, that is, of the rules and regulations of the transportation department. In order to properly function in his duties he must have knowledge of those rules and in addition all special instructions appearing in the timetables, all special instructions appearing on bulletin boards by the superintendent and all special instructions and circulars [fol. 4348] from the general office relating to his duties as a passenger conductor, change in tariffs, and so forth. Particularly referring to transportation rule 843, I quote for the information of the court, "The general direction and government of the train is vested in the conductor and all other persons employed on the train will obey his instructions. Should there be any doubt as to the authority or safety of procedure, he will consult the engineer, who will be responsible with him for the safety and proper handling of the train and such use of signals and other precautions as circumstances may require. He must obey the instructions of the yardmaster within yard limits and be governed by the directions of agents in doing work at stations and conform to the instructions issued by the traffic and accounting departments."

I also wish to quote rule 844, "Before leaving initial station, the conductor must be assured that all members of his crew are on hand, that the brakes are in proper working order, hand brakes released, and his train is provided with the proper tools, supplies, and flagging equipment."

Also rule 845, "Conductors must assure themselves that their subordinates are competent and instruct them if neces- [fol. 4349] sary in the proper performance of their work and caution them as to its risk. Incompetency and disobedience must be reported."

Rule 846, "The protection of the train is the most important. The conductor must not allow other duties to interfere therewith. They must require their flagmen to act with the utmost promptness and in strict accordance with the rules. A trainman must be stationed when practicable on the rear of every train while in motion."

Also I would like to refer to general rules appearing on page 3 of the book of rules: "Safety is of the first importance in the discharge of duty. Obedience to the rules is required. To enter or remain in the service is an assurance of willingness to obey the rules. The service demands the faithful, intelligent, and courteous discharge of duty. Promotion depends upon faithful discharge of duty and capacity for greater responsibility. Suggestions from employees intended to promote safety, economy or service, are solicited and will receive consideration. The public judges a railroad by quality of service, condition of the property, and by the appearance and conduct of its employees."

There are also many other duties prescribed in the book [fol. 4350] that the conductor must have full knowledge of in order to properly perform his duties both in freight and passenger service.

Q. In freight service he has some particular duties, a record of the consist of his train?

A. Yes, the first important duty is when the conductor goes on duty to compare his watch with the standard clock in the register room. After he has consulted the bulletins he then calls for his orders and checks the train register of all overdue superior trains. He then receives his orders and checks his train orders against his clearance card which is issued by the operator and dispatcher. He must particularly note that he has all of the orders that his clearance card calls for, that the orders are properly addressed to him, that they have the signature of the chief train dispatcher and particularly note that they have been completed and the time the order was completed and familiarize himself with these orders and know positively that they are proper before he starts to deliver them to the engineer. When he meets the engineer, he compares time with the engineer. He gives the engineer his orders together with the train register check. The engineer reads the orders and if they are found to be O. K. then the train proceeds.

[fol. 4351] Q. Describing the duties of a brakeman, you referred to one of his duties as that of replacing journal brasses?

A. Yes, sir.

Q. When is that required?

A. When a journal becomes overheated, if in the judgment of the conductor and that judgment is based upon the extent of the heat of the journal and the appearance of the brass. If it appears that the brass is broken or cracked, we re-brass the car which requires that we get the engine back if possible, get the jack off the engine and bar and blocks, get the dope buckets with the packing waste; the brasses and crow-foot and take them to the car where we jack up the car from the journal box sufficient space to permit us to take out the brass and wedge. Then we inspect the journal to determine whether or not it has been cut and we replace the new brass, first cooling off the journal as best we can by carrying water in buckets or having the engine right handy to get it off the engine. Then we let the jack down and repack the box with oil waste. Then we apply what we call a cooler, it contains about four or five buckets of water with a hose attached. We attach this cooler to the journal box and permit a little water to drop [fol. 4352] on it while we then take up steam. This requires close attention on the part of the brakeman, sometimes it is necessary to leave them out there to carefully guard this car to see that it does not heat again. Sometimes it is necessary to rebrass them a second time but generally speaking if you re-brass them once they then go along pretty good.

[fol. 4353] The Court: How long does this process take?

A. Sometimes, I would say about the quickest it can be done, about 45 minutes, sometimes longer. That depends, Your Honor, if we happened to be at a side track where we can bring the engine back to get our material to the particular location of the car, we should do it in 45 minutes. If it is in the vicinity of the main line where we have no side track and we have to carry that to the car, it takes much longer, an hour and fifteen minutes, or an hour and thirty minutes, and that necessitates, if possible, the conductor getting in touch with the dispatcher to inform him of our delay or sometimes if we are at a station where we can converse with the dispatcher, he then will either instruct us to rebrass it or set the car out.

Mr. Strouss: Do you have many occasions to replace these journal brasses?

A. Why, the past year or two we have had very few as to what we used to have several years ago.

Q. Does the length of the train have any relation or effect upon the necessity or time required to replace these brasss?

A. Yes, that is an important factor. First, each additional car taken in the train is one added responsibility, and [fol. 4354] also, the observing of the car or cars to see that they do not run hot. Sometimes, in picking up these cars, trespassers or others have removed the waste from the journals, which requires us to repack those journals before we move them, if we can. Sometimes, just half of it has been removed, which causes the journal to run hot by insufficient oil waste in the box, which prevents any lubrication.

Q. Now, if you are able to observe these cars in time, you often are able to correct the trouble before it is necessary to rebrass journals?

A. Yes; sometimes in our standing train inspection we detect a journal bearing becoming worn or a little hot, and in that case we go to the engine or the caboose and get a packing iron and hook, some water and some fresh waste, if necessary, and we repack that box, and in many instances they go along all right. However, if we don't locate them and they become very hot, in most of the cases we have to rebrass them.

Q. Is it possible to sometimes observe this car while the train is in motion, and prevent the replacing of the brasses?

A. Yes, to the best of our ability we make close running observation of the train, the best that the naked eye will [fol. 4355] give us to see that no bearings become hot.

Q. Now, in connection with broken knuckles or draft gears, what are your duties in that connection, if there happens to be a broken knuckle?

A. Well, a broken knuckle, we first have to determine what the cause is; when we find it is a broken knuckle, we either go to the engine or to the caboose and get a knuckle, and take it up and put it in the car. Sometimes we can do this very handy by throwing it off the engine and have the engineer pull down, put it on the car and take it back and put it in; other times it is impossible to do that because in a territory where the view of the engineman is obstructed

or he would be unable to back up the train when we pull down, in that event we will have to carry the knuckle ourselves.

Q. Now, in the operation of these trains, is there some provision made for the inspection of the train?

A. Yes.

Q. And by whom is this inspection made?

A. The inspection is made by the trainmen and the conductor assists also.

Q. Are there some points where inspections are made [fol. 4356] by others than trainmen?

A. Yes, at terminals such as Tucson, Phoenix, Yuma, and El Paso, Douglas, these inspections are made by regular car inspectors.

Q. And how do they make that inspection?

A. Two men, one takes each a side, and they inspect the brake-beams, note whether the air is working in the car, flanges, draw-bars, and a general inspection to determine any defects that may exist in the car.

Q. Have there been any changes in the points at which car men make inspections?

A. No, the present arrangement has been in effect here now for a good many years.

Q. There were, prior to that, additional car men?

A. Yes, years ago we had car men at Lordsburg and at Gila Bend also.

Q. Now, the trainmen also make inspection, I believe?

A. Yes, every stop, so far as the trainman is concerned, is an inspection; it is the duty of the brakemen immediately to start out inspecting the train as soon as it stops.

Q. Now, is that covered by rules 827 and 828?

A. Yes.

[fol. 4357] Q. Will you read those two rules?

A. Rule 827: "The running gear, brake and draft rigging of trains must be inspected by trainmen as often and as closely as practicable while on the road. If defects be discovered they should be corrected if possible; cars unsafe to run must be set out. Special attention must be given to hot bearings. Places at which freight trains must stop for inspection, or the maximum distance a freight train may run without stopping for inspection, will be designated in the timetable." On the Tucson division, the maximum speed a freight train may run without inspection, as appearing in the time-table, is 65 miles.

Q. You said "speed"; you meant distance?

A. Yes, the distance. On the Rio Grande, the maximum distance is 60 miles, and on the branch line of the Tucson division it is 40 miles.

Q. Now, your rule 828.

A. Rule 828: "Speed of a freight train must not exceed eight miles per hour for a distance sufficient to permit running inspection when starting. Trainmen must closely watch to see that brakes are released, and if necessary must signal enginemen to stop if wheels are found sliding. Each trainman will be held responsible for wheels slid [fol. 4358] under that part of the train in his charge. Conductor in reporting flat wheels must give the name of trainman in charge. They must mail promptly to the superintendent a report of flat wheels discovered under the cars in their train."

Q. Now, you say there are two types of inspection made by trainmen, a standing inspection and a rolling inspection?

A. Yes, sir.

Q. How is the standing inspection made?

A. Well, if the train is in the side track, the swing brakeman and the rear brakeman go up the train, one on each side, the head brakeman proceeds back from the engine on one side until they meet. Then they all continue on up to the head end inspecting both sides of the train, which includes journal boxes, brake-beams, drawbars, flanges, or that cars are all released, that the air is released on all the cars.

Q. Then you make the rolling inspection?

A. Yes, when the train again starts to proceed the rear and swing brakemen get to the head end and they permit the entire train to roll by.

Q. And at what rate of speed?

A. Eight miles per hour.

Q. Now, how are the inspections made at night?

[fol. 4359] A. At night they are made the same way, except the trainmen carry electric lanterns.

Q. Are they the same type of lantern a carman would have to determine that?

A. No, they are a different type of lantern. Our lanterns don't have reflectors on them like the car inspector lanterns do.